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CONTRIBUTIONS FROM THE CRYPTO GAMIC LABORATORY OF
HARVARD UNIVERSITY. No. LXXXI.

*EXTRA-AMERICAN DIPTEROPHILOUS LABOUL-
BENIALES.*

BY ROLAND THAXTER.

(Continued from page 3 of cover.)

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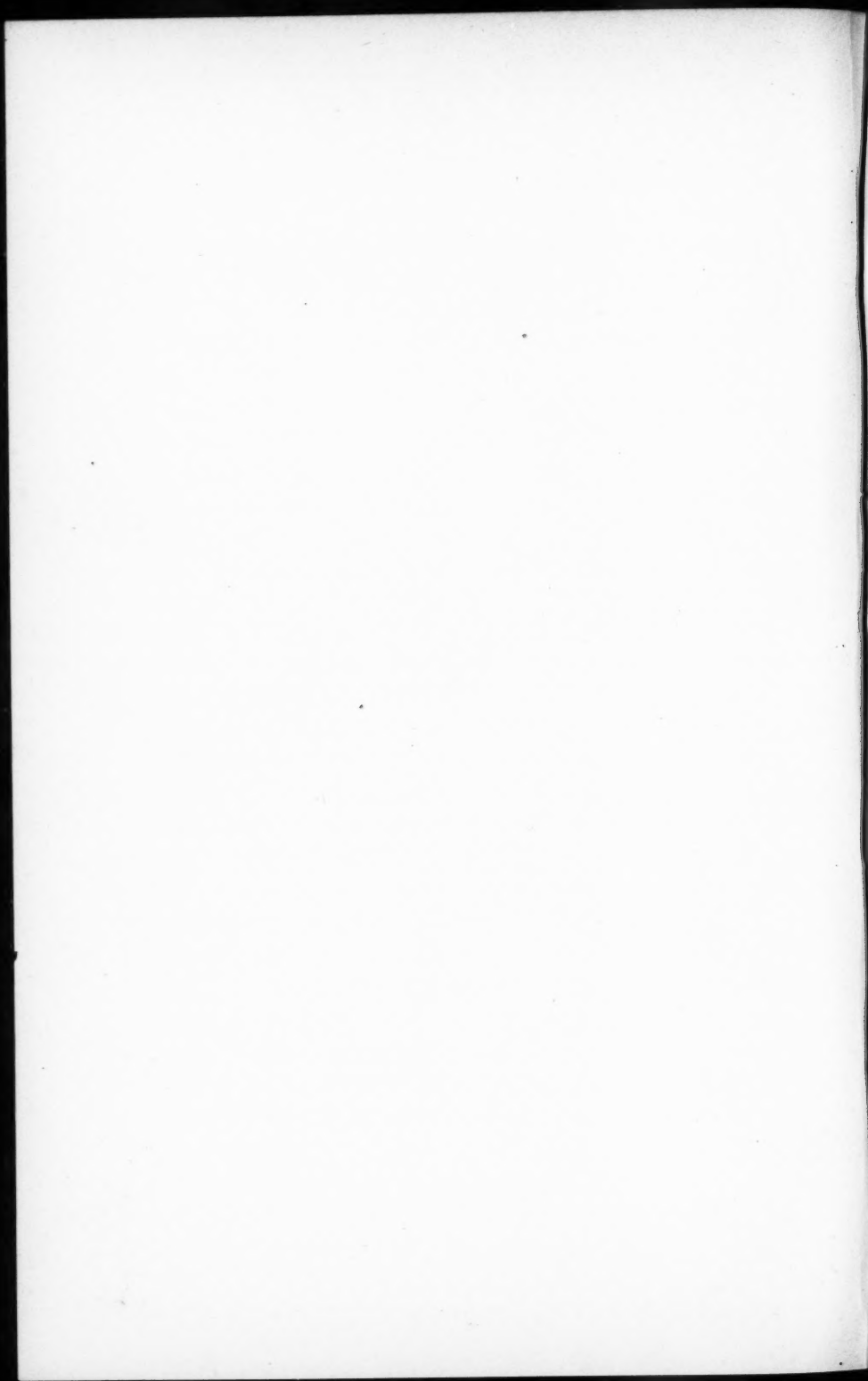
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EXTRA-AMERICAN DIPTEROPHILOUS LABOULBENIALES.

BY ROLAND THAXTER.

Received, February 14, 1918.

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In a recent Contribution (These Proceedings, 52, No. 10) the writer included such American Laboulbeniales as were then known to be parasitic on dipterous insects. In the present paper all the extra-American forms which have accumulated in recent years have been included save only a few which, owing to their condition, or the scantiness of the available material it has seemed best to omit. In order to complete the enumeration of all the species of Stigmatomyces which have thus far come under my notice one coleopterophilous type has been added, a parasite on the coccinellid genus *Chilomanes*; but with this exception only dipterous hosts have been included. As in previous instances I am indebted to the kindness of Mr. Schwab and Mr. Moulton for the hosts from Kamerun and from Borneo, and several very interesting forms were found among a small number of flies which I owe to the courtesy of Dr. S. B. Wolbach, who brought them from the Gambia River. I am indebted to Dr. P. Speiser for certain interesting specimens and determinations. It has proved impossible to obtain specific and in some cases even generic determinations, especially of the peculiar African hosts. For assistance in this connection I am indebted to Prof. Aldrich and to Mr. Banks. The terminology used in the present paper is that of my previous Contribution above cited.

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Dimeromyces pedalis nov. sp.

Male individual. Hyaline, the axis consisting of three cells; the basal much larger, with a well developed black foot; the two others rather narrow, subequal, of nearly uniform width, externally convex: the terminal appendage separated by a slightly blackened septum, its basal cell clearly defined, twice as long as broad; the rest of the appendage slender, slightly tapering, with an indistinct septum. Antheridium erect, the neck and venter rather clearly distinguished and of about equal length, the latter externally convex, and extending to the basal cell, its inner margin in continuous contact with those of the subbasal and terminal cells. Total length to tip of antheridium $28 \times 8 \mu$. Antheridium $18 \times 5 \mu$. Appendage $18 \times 3 \mu$.

Female individual. More or less tinged with brownish yellow, especially the appendages; axis of the receptacle consisting of usually about eight cells, tapering somewhat above and below; the primary appendage erect, terminal, separated by a dark septum; its basal cell somewhat inflated, the distal portion tapering, and with an indistinct septum: secondary appendages usually four, sometimes three, relatively short, the perithecia protruding beyond their abruptly curved or recurved tips, the terminal cells inflated and often splitting in two lip-like halves which may become somewhat curled; the axis of five or usually six cells, tapering toward the base. Perithecium single in the types, usually arising from the third cell below the primary appendage, its very short stalk bent abruptly, so that it diverges somewhat irregularly sidewise; tapering slightly to a broad blunt apex which may be almost symmetrically three-papillate, the papillae large and broadly rounded, the middle one higher and broader; or more irregular according to the point of view. Spores $18 \times 2.5 \mu$. Perithecia $42-52 \times 14 \mu$. Receptacle $35-40 \times 8 \mu$. Appendages, primary, 30μ , secondary $40-50 \mu$.

On the legs of *Oscinosoma inaequalis* T. Beck. No. 2139, Sarawak, Borneo.

This species is intermediate between *D. Oscinosomalis* and *D. coarctatus*. Apart from other differences, it may be separated from the former by its short appendages and normal foot, and from the latter by its shorter perithecia, and less numerous appendages, which lack the peculiar right and left divergence so characteristic in the papuan type. The host has been kindly determined by Dr. Speiser.

Dimeromyces Kamerunensis nov. sp.

Male individual. Very small, hyaline or becoming faintly tinged with brown, the axis consisting of three successively smaller cells somewhat longer than broad, the terminal appendage subtended by a black septum, its basal cell faintly colored, with convex margins; the subbasal similar in size; the rest of the appendage hyaline, slender, somewhat tapering, with two indistinct septa. Antheridium single, or rarely two, the venter somewhat bulging, tapering to the slightly outcurved, blunt, pointed distal portion. To tip of antheridium $30 \times 8 \mu$, including relatively large black foot. Appendage $20-40 \times 4 \mu$.

Female individual. Axis of receptacle brown above, hyaline below; consisting of from six to twelve, or sometimes more, superposed cells; the basal several times as long as broad, but slightly narrower toward the base; the remaining cells broader than long, the lower more flattened, the terminal one small and rounded, bearing distally a short tapering appendage similar to that of the male; usually six to eight of the cells below it bearing single simple appendages or perithecia: the appendages erect or but slightly divergent, the cells above the basal separated by slight indentations: consisting, usually, of seven cells; the basal separated by a narrower purplish black region from the subbasal, which is about as long; the third to fifth successively smaller; the fifth somewhat broader than long; the sixth minute, distally rounded into the base of the terminal cell; which is large, greatly inflated, distally abruptly narrowing to a broadly rounded extremity, disorganized at maturity, the spreading or revolute remains of its wall persistent, and adhering around the minute subterminal cell; the appendages becoming dark brown, diverging in two more or less definite ranks, the extremities slightly incurved, one or two of the uppermost much shorter. Perithecia uniformly pale dirty brownish yellow, the apex hyaline; one or two in number, relatively small, hardly longer than the appendages, or even shorter, becoming gradually broader from the insertion upward; the lower half somewhat inflated, tapering thence to the broad termination, the compressed inner lip-edges forming a short, slightly oblique, short-conical projection, subtended by three well marked papillae. Perithecia $88-105 \times 14-21 \mu$. Appendages, longest $105 \times 12 \mu$; primary appendage about $25 \times 3 \mu$.

On the head and legs of a pale yellow oscinid with slightly smoky wings. No. 2367, Kamerun, West Africa.

This striking species is most nearly related to *D. coarctatus*, but

differs widely in the structure and position of its appendages and perithecia. The measurements are taken from larger specimens.

***Dimeromyces Oscinosomalis* nov. sp.**

Male individual perfectly hyaline and very thin-walled; consisting of three superposed cells, the basal much larger and somewhat inflated below; the two others longer than broad, somewhat irregular, of nearly equal length, the terminal appendage distinguished by a slightly darkened septum and constriction, slightly inflated below and tapering distally. Antheridia one, or often two superposed in oblique contact, slightly divergent, the venter and neck not abruptly distinguished, the latter stout and blunt; a short several-celled secondary appendage rarely formed from the subbasal cell. Receptacle $25\ \mu$. Antheridia $18 \times 5\ \mu$.

Female individual. General habit usually subsigmoid. Axis of the receptacle consisting of usually six cells; the base hardly longer than broad, much larger, stout and penetrating the host by a variably developed rhizoid which may be vesicular or taper into a short stout filament, a small, dark primary foot usually distinguishable: the two or three cells above broader than long, somewhat flattened, the two distal ones successively smaller and somewhat rounded; the inflated base of the short tapering primary appendage distinguished by a constriction and dark septum. Secondary appendages usually three, rarely four, long, slender, becoming blackish brown, the distal half curved usually inward away from the perithecium; the distal cell enlarged and abruptly curved, or even uncinulate, becoming irregularly split into an upper and lower half; the basal cell small and short, distinguished from the much larger, often somewhat inflated subbasal cell by a dark septum, the total length nearly twice that of the perithecia. Perithecia normally single, arising from the fourth cell of the receptacle, rather stout, slightly bent inward, the stalk obsolete, outer margin strongly convex, tapering slightly to the broad very irregular termination from which the lip-cells, which are all unlike and asymmetrical, project variously according to the point of view. Perithecia $50-65 \times 16-20\ \mu$. Receptacle, exclusive of rhizoid, $35-50 \times 12-16\ \mu$. Appendages, primary $18\ \mu$; secondary, longest, $125 \times 8\ \mu$. Total length to tip of perithecium $75-95\ \mu$.

On the inferior surface of the abdomen of *Oscinosoma inaequalis* T. Beck. No. 2139, Sarawak, Borneo.

This species is most nearly related to *D. pedalis* and *D. rhizophorus*,

but is distinguished from the former by the presence of a well developed stout rhizoid, and by the conformation of its perithecial termination; while from the latter it differs in its greatly elongated appendages and simple rhizoid, as well as in other details. A minute primary foot, which forms during the early germination of the spore, usually persists beside the entering rhizoid. The male is very thin-walled and difficult to see from the fact that it is perfectly hyaline. It does not appear to enter the host, but the basal cell spreads to form a small sucker like attachment.

***Laboulbenia clavulifera* nov. sp.**

Erect, straight or slightly bent between the basal and subbasal cells. Foot normal, well developed; basal cell somewhat longer than the subbasal, and separated as a rule by a slightly oblique septum; the subbasal slightly broader distally, pale dirty brownish; the basal nearly hyaline; cells III and VI subequal and opposite, cells IV and V nearly equal, or cell five narrower and slightly longer. Insertion-cell normal, well developed, nearly black. Base of outer appendage slightly oblique, the axis deep brown with the septa darker, erect beside the perithecium; consisting of three cells increasing in diameter distally, and bearing a terminal tuft of short irregularly developed branches. Basal cell of the inner appendage small, pale, bearing a short one-celled branch on either side, usually terminated by two large brown antheridia. Receptacle above cell II concolorous with it, the cells above cell VI not clearly distinguished. Perithecium wholly olivaceous, somewhat paler toward the base, the venter slightly inflated, its base about opposite the insertion-cell; tapering to the blunt apex, the wall-cells describing a half turn, so that the view of the apex is either anterior or posterior, and appears symmetrical, with the lateral lips forming prominent rounded projections on either side of a somewhat higher median elevation. Spores about $34 \times 2.5 \mu$. Perithecia $70-88 \times 18 \mu$. Appendage to tips of branchlets 70μ ; the axis $42 \times 12 \mu$, distally. Total length $150-225 \mu$.

On the legs of a species of *Physogenia*?. No. 2748. Kamerun, W. Africa.

Although this species has the typical structure of *Laboulbenia*, it appears to be most nearly related to *L. pectinulifera*, which occurs on the same host, but has the structure of *Ceraatomyces*. The stout, clavate, deeply colored axis of the outer appendage, which is erect and bears a terminal tuft of short ill developed branchlets, gives it a characteristic appearance.

Laboulbenia Lagarocerinus nov. sp.

Basal cell bent at right angles, swollen, distinguished by a constriction, twice as long as broad, or more, lying flat on the substratum, pale brown, modified to form a concave attachment below the middle, which is somewhat darker, and serves as a foot; the axis above it straight, long and stout, erect; cell II pale dirty olivaceous, indistinctly punctate, nearly uniform, obliquely rounded distally and broader than the portion of the receptacle above it; cells III-V replaced by a single cell, two to three times as long as broad, its upper half quite free, and bearing distally a well developed unmodified insertion-cell. Appendages olivaceous, erect or bent sidewise, lying close against the lower half of the perithecium, small and poorly developed; the outer straight, simple, of two or three cells; the inner bearing two or three branchlets with short irregular terminations, and one or two stout relatively large antheridia, with rather abruptly distinguished necks; cell VI pale, somewhat broader than long; the cells above concolorous, not clearly defined, the region continuous with the base of the venter; perithecium straight, of somewhat irregular outline; the wall-cells clearly indicated by dark lines which are slightly spiral, describing somewhat less than half a turn; the venter darker, clearer olivaceous, slightly inflated below, tapering distally to the tip and apex; the latter rather narrow, the lip-cells prominently rounded; the outer larger, and lying wholly above the smaller inner ones. Perithecium $75-85 \times 20-22 \mu$. Appendages about 35μ . Cell I $38 \times 20 \mu$. Cell II, $62-70 \times 14 \mu$. Total length above cell I, $140-165 \mu$.

On the wing of a new species of *Lagaroceras*. Gambia River, West Africa, No. 2326.

This species, which was found on one of the flies collected by Dr. Wolbach, develops on the veins of the wings, those on the intervening membrane producing only antheridia. It is most clearly distinguished by its aberrant basal cell, which lies flat on the vein, and is attached to it by a sucker-like depression just below the middle. Its structure is that of the *Ceraimyces*-type.

Laboulbenia Muiriana nov. sp.

Foot well developed, basal cell short, hyaline, abruptly broader below the septum; subbasal cell somewhat broader, hyaline, punctate, straight, two to three times as long; cell III somewhat rounded and

externally convex, but slightly larger than cell VI; cell IV externally convex, slightly broader than long; cell V as long, but narrow; cells II-VI and the small basal cell region yellow and obscurely punctate. Insertion-cell translucent reddish, thick, higher than the base of the venter; basal cell of the outer appendage narrower and about half as long as the subbasal, both hyaline; the latter bearing distally two greatly elongated, stout, nearly uniform, simple branches: an outer pale brown, the lower half of its basal cell narrow and blackened, the inner hyaline or paler, both with a tendency to enlargement at the septa. Basal cell of the inner appendage very small, hyaline, bearing several long slender olivaceous antheridia directly, and a short one-celled branch which also bears one or two. Axis of the perithecium, including the stalk- and basal cell region, diverging at an angle of about 45° from that of the receptacle; the perithecium yellow, slightly inflated at the base, especially on the inner side, tapering very slightly and then rather distinctly broader at the point where the tip is rather well distinguished, tapering to the characteristically formed apex; the inner lip-cells deeply colored, and ending in a hyaline, blunt apiculus, higher than the outer; which slope obliquely, are distally quite hyaline and distinctly prominent externally, with a similar dark colored obliquely separated suffusion of their lower half, which extends down along the margin of the tip. Perithecia $66-70 \times 18 \mu$. Receptacle, to insertion-cell, 88μ . Subbasal cell $50 \times 16 \mu$. Appendage 368μ . Total length 115μ .

Growing at the base of the posterior legs of a small fly belonging to the Oscinidae. No. 2181. Laloki River, British New Guinea.

I have dedicated this very beautiful species to Mr. F. Muir, who very kindly collected for me a small lot of flies in New Guinea, among which two perfect specimens were found. It is not unlike simple forms of *L. cristata*, except for its punctuation, extraordinarily elongated appendage, and peculiarly modified apex.

***Laboulbenia Pachylophi* nov. sp.**

Straight, or but slightly curved; the perithecium and basal cell of the outer appendage deep translucent olive brown. Structure normal. Basal cell hyaline, enlarged in relation to the foot to form a bulbous base; cell II slightly longer, hardly broader, becoming somewhat suffused with brown, and indistinctly transversely punctate, as are the cells above it: cells III and IV subequal, somewhat obliquely

separated, hardly longer than broad; cell V long and narrow, reaching a little lower than the inner margin of cell IV. Outer appendage rather stout, the three lower cells somewhat similar, longer than broad, slightly constricted at the septa; the basal shorter, deep olive brown, concolorous with the clearly defined insertion-cell; the distal part of the appendage slightly soiled with brown, bearing a few irregular hyaline branches: basal cell of the inner appendage very small, hyaline above, and producing right and left branches, the basal cells of which are rather long, bearing one or two long slightly brownish antheridia and a few hyaline branchlets; both appendages and their branches appressed and curved against the perithecium, the branchlets reaching above its tip. Perithecium straight, its axis sometimes slightly divergent, the two lower tiers of wall-cells deeper olive brown, faintly granular-punctate; the divisions marked by rather clearly distinguished lines; the venter but slightly inflated, tapering to the blunt apex; the coarse lips nearly hyaline, the inner more prominent and subtended by a darker blackish area. Perithecium $60-65 \times 22 \mu$. Appendages 70μ . Total length $120-140 \mu$, the bulbous foot 16μ .

On the legs of a specimen of *Pachylophus frontalis* Lev., kindly communicated by Dr. P. Speiser. From Killimandjaro, East Africa.

***Laboulbenia porrigens* nov. sp.**

Basal cell relatively short, bent to one side, more or less swollen or distorted, bearing the foot on its under side, somewhat paler than the subbasal cell which is stained with pale dirty brownish, and punctate-roughened, almost its whole distal margin obliquely separated from cell VI. Cells III-V replaced by a single cell somewhat more deeply suffused, and more closely punctate than the subbasal, of nearly uniform diameter, and two to three times as long as broad, and projecting outward, almost at right angles, free from the receptacle; this finger-like projection bearing the appendage and insertion-cell at its extremity. Insertion-cell well developed, deep olive brown, concolorous with the basal cells of the appendages. Axis of the outer appendage consisting of two cells; the upper longer and much paler, bearing distally usually two stout branches, which branch successively about five times; the divisions above the second perfectly hyaline, slender; the ultimate branchlets tending to bend downward, and to produce rounded tooth-like projections from their lower surfaces, which are more or less irregular: basal cell of the inner appendage less than half

as large as that of the outer, somewhat prominent, bearing two appressed branches, the basal cells of which bear one or two dark brown antheridia and several short dark sterile branchlets one of which may be hyaline and similar to those of the outer appendage. Basal cells of the perithecium concolorous with cell VI and indistinctly punctate; the region very broad, surrounding the base of the ascigerous cavity, and forming a very broad insertion for the base of the dark olive brown perithecium; which tapers irregularly, the two lower tiers of wall-cells distinguished by dark lines, the second rather abruptly narrower and tapering, forming a more or less distinct neck-portion; the tip and apex slightly bent outward, abruptly paler, somewhat broader, tapering to the well defined, but not very prominent, lips; the inner subtended by a darker suffusion, and not more prominent than the outer. Spores $35 \times 3 \mu$. Perithecia $95 \times 28 \mu$ at the base. Appendage, longest, $140-157 \mu$. Cell III-V, longest $40 \times 15 \mu$, shortest 25μ . Total length $175-210 \mu$.

On the superior surface of the abdomen near the tip, of a small fly of unknown family. No. 2651, Kamerun, W. Africa.

The host of the very peculiar species was unfortunately lost in the mails, but the characters of the parasite are so distinct that its identification is of less importance. The species is most nearly related to *Laboulbenia* (*Ceraimyces*) *Dahlia*, although it does not penetrate the host by haustoria, and has a quite different appendage. The form of its perithecium, tapering from a very broad base, is very similar, as well as the elongation of cell III-V, which, however, is much more extreme. The branchlets of the appendage which projects far outward at nearly a right angle to the axis of the receptacle, recall those of *L. pectinulifera*, showing the same tendency to produce rounded, short, tooth-like projections from their under sides. This character is not so well marked, however, and more irregular.

***Laboulbenia pectinulifera* nov. sp.**

Quite hyaline below the venter and insertion-cell or becoming faintly brownish, usually slightly curved, especially at the base. Foot normal, large, associated with a slight swelling of the basal cell above it, or, when on the wing, small, associated with a narrow black contact-induration of the abruptly curved base of cell I; cell II of about the same length and often separated by a slight indentation; cells III-V replaced by a single cell, the extremity of which is free on the inner side

and externally slightly prominent below the well defined olivaceous insertion-cell; outer appendage strongly divergent, slightly curved outward, consisting of three cells; the basal somewhat narrower; the middle somewhat longer, deeply tinged with olivaceous brown, or slightly reddish; the terminal cell bearing from its broader distal surface a series of branches curved outward in a fan-like tuft, and once or even twice branched; the lower, outer, branches suffused at the base, the rest quite hyaline; all tending to produce unilateral series of from two to five short branchlets, which may be more or less regular and comb-like, or more confused and occasionally developed on both sides; inner appendage consisting of a small hyaline basal cell which may bear two or three short branches, each consisting of a single hyaline cell terminated by a pair of relatively large long brown antheridia. Perithecium slightly inflated above the base, which extends below the insertion-cell, tapering to the rather coarse-lipped apex, the inner lips more prominent and rounded; the upper and lower limits of the two lower and more deeply suffused wall-cells clearly indicated. Spores $35-40 \times 3 \mu$. Perithecia $70-75 \times 18-24 \mu$. Appendage to tips of branches $50-64 \mu$; the three basal cells 35μ . Total length to tip of perithecium $100-150 \mu$.

On the thorax and wing of a sapromyzid fly, *Physogenia*? Nos. 2662 (Type) and 2748. Kamerun, West Africa.

This species is chiefly remarkable for the spreading tuft of peculiar branches which terminate the deeply suffused, three celled axis of the outer appendage; many of the branchlets bearing on the lower side a more or less well marked series of closely set, blunt outgrowths which give them a comb-like appearance. One or more of these outgrowths may arise also from the upper side, or they may be less regularly developed. The specimens on the thorax of the host are for the most part more slender, with normally developed foot, and somewhat stouter and more uniform basal and subbasal cells, which are distinguished by a slight enlargement, rather than an indentation, at the septum. A few individuals growing at the base of the wing are also somewhat peculiar in that the axis of the appendage is distinctly reddish, and the apex of the perithecium is turned so that it is viewed at right angles to the normal position, the anterior lips projecting conspicuously and almost symmetrically on either side of the posterior, which lie between and project above them. The species is most nearly allied to *L. clavulifera*, but belongs to the *Ceraomyces*-type, while the last mentioned species has the structure of a typical *Laboulbenia*.

Laboulbenia Psilina nov. sp.

Slightly sigmoid, the venter yellowish brown, rather coarsely punctate, the basal cell paler and punctate, the basal cell of the outer appendage dark olivaceous, the antheridia paler; otherwise nearly hyaline. Basal cell relatively short, abruptly bent above the well developed foot, subbasal cell more than twice as long, slightly broader than both the basal cell below and the receptacle above it, nearly uniform throughout; cells III-V replaced by a single cell, the distal third or less of which is free and slightly divergent, externally nearly straight, and hardly at all prominent below the thick normally blackened insertion-cell. Axis of the outer appendage consisting of three cells; the basal deeply suffused, oblique below; the second larger and faintly suffused, slightly inflated; the upper shorter and bearing distally a crest-like series of branches, from the short basal cells of which two or three somewhat irregular branchlets arise which are about as long as the rest of the appendage. Basal cell of the inner appendage small bearing an inner antheridium directly and a short one-celled branch which is terminated by a second. Cell VI oblique above and below, slightly longer than broad, the cells above it hardly distinguishable. Perithecium divergent, the translucent venter slightly inflated below, and abruptly and clearly distinguished from the hyaline tip and the basal cell region; tapering to the obliquely rounded slightly geniculate apex, which is broader, the inner lips more prominent than the broader obliquely rounded outer ones, and externally suffused; the suffusion extending down to the persistent base of the trichogyne, which remains as a slight prominence. Spores about $28 \times 3 \mu$. Perithecia $50-55 \times 18 \mu$. Appendage to tips of branchlets $55-70 \mu$. Total length $120-140 \mu$. Subbasal cell $50-62 \times 18 \mu$.

On the superior surface of the abdomen of a small fly belonging to the Psilidae, probably belonging to the genus *Psila*. No. 2647, Kamerun, W. Africa.

This species, which is of the *Ceraimyces*-type, is most nearly allied to *L. pectinulifera*. Its general form and coloration, and the character of the branchlets of the appendage are, however, quite different.

Laboulbenia Steleoceri nov. sp.

Pale dirty brownish, perithecium blackish olive brown, its axis and that of the basal cell bent slightly inward. Basal cell somewhat curved, or geniculate, hyaline below and broadly rounded; the small

partly black foot lateral and anterior; subbasal cell distinguished by a slight constriction, slightly broader, more than twice as long, distally but slightly broadened, the suffused portions of both cells finely punctate; distinguished by a very broad oblique septum from cell VI: cells III-V replaced by a single, dark olivaceous, outwardly prominent cell. Insertion-cell free on both sides, somewhat broader than long, translucent olivaceous, bearing distally the outer appendage: which is apparently short and simple, its basal cell suffused, hardly larger than the insertion-cell; basal cell of the inner appendage slightly larger, bearing two short branches once or twice branched which bear a small number of large stout antheridia near the base. Cell VI broad, flat, subtriangular, externally prominent; cell VII small triangular, concolorous, externally prominent, both faintly punctate: basal cells broad, flattish concolorous with the cells below. Perithecium nearly opaque, subconical, convergent, externally slightly convex; its base very broad, its apex blunt, abruptly broader; the lips rounded, the outer hyaline and more prominent, the inner suffused, and subtended by a small darker area lying above a rounded paler spot; below which, externally, the tooth-like, opaque, persistent base of the trichogyne projects conspicuously. Perithecium about $50 \times 22 \mu$ at base $\times 7.5 \mu$ distally, the apex $\times 9 \mu$. Cell I, $30 \times 15 \mu$, cell II $70 \times 16 \mu$; cell III-V, $14 \times 8 \mu$. Total length about 150μ .

On the left wing of *Steleocerus lepidopus* Beck. No. 2328, Gambia River, West Africa.

This peculiar species was found among a small number of flies very kindly collected for me by Dr. Wolbach. Three specimens have been examined, two of which are fully matured. The appendages in all are partly broken and do not reach to the apex of the perithecium. The species belongs to the *Ceraomyces*-type, with which it corresponds in all respects.

***Rhizomyces circinalis* nov. sp.**

Basal cell constricted below and entering the host by a rhizoidal apparatus; subbasal cell somewhat larger, hardly longer than broad, the two tinged with brownish yellow. Axis of the appendage consisting of about thirty cells, or less, curved inward, distally circinate or helicoid; the basal cell deep reddish brown, sometimes with an abortive branch; the rest pale yellowish, with a tinge of brown; the subbasal smaller and darker than the cells above; which are somewhat longer than broad, except at the circinate extremity, thick walled,

each bearing a branch distally and externally which, in the cells above the seventh or eighth, is replaced by a single cell bearing one or more antheridia; the branches, of which there are about seven, all fertile, except that from the subbasal cell which is sometimes sterile, consisting of from one to three cells forming a short divergent axis, and bearing each from one to several straight concolorous antheridia distally and inwardly; the terminal and sometimes the subterminal cells producing externally a vertical series of from two or three to five out-curved, closely set, short, rather stout, brownish, simple branchlets, which are usually slightly geniculate near the middle: the branches replaced in the cells of the main axis above the eighth by a single small cell, from which one or more antheridia arise directly. Stalk-cell of the perithecium terminal, long and stout, nearly uniform, except that the diameter is somewhat less at the base, and distally, where the basal cell region is rather abruptly distinguished; the latter rich dark red amber-brown, the basal cells surrounding the lower third of the asigerous cavity, their external margins prominent and very thick-walled; the rest of the perithecium concolorous or somewhat darker; the two lower tiers of wall-cells marked by more or less distinct transverse lines; the whole slightly curved, somewhat inflated below, tapering distally to its more or less clearly indicated junction with the paler tip and apex, which taper to a bluntly rounded termination, with hardly distinguished lips; the tip giving rise, from almost its whole inner surface, to a slightly divergent and curved, rather slender, concolorous appendage, which subtends the apex. Spores small and numerous, perhaps about $15 \times 2 \mu$. Perithecia, including basal cell region, $150 \times 58 \mu$; stalk-cell $508 \times 28 \mu$. Receptacle $35 \times 28 \mu$. Appendage about $275\text{--}350 \mu$, the axis $\times 12 \mu$, the branches, larger, about 40μ . Total length to tip of perithecium 690μ .

On the inferior surface of the abdomen of a species of *Diopsis*, near the tip. No. 2330, Gambia River, West Africa, Dr. Wobach.

A very distinct species allied to *R. ctenophorus*, at once distinguished by its spinose perithecium and circinate or helicoid appendage.

***Rhizomyces confusus* nov. sp.**

Rhizomyces crispatus Thaxter, pro parte. Mem. Am. Acad. Arts and Sci. Vol. XIII, No. 6, p. 323, Plate LII, figs. 19 and 21.

When this species was first described, the material of *R. crispatus* was somewhat scanty, but the examination of a large series has shown

that the differences which separate the two, and are indicated in the published figures, are constant and more than sufficient to distinguish them specifically. The present species is differentiated by the characters of its receptacle, appendage and perithecium, which appear to be quite constant, and may be summarized as follows.

Subbasal cell of the receptacle prolonged to form a more or less clearly distinguished, blunt, tooth-like protrusion which projects beyond the base of the stalk-cell of the perithecium, the axis of which makes a considerable angle with that of the receptacle. Appendage more divergent and much longer than that of *R. crispatus*, the branches distinctly shorter and more numerous. Stalk-cell of the perithecium much shorter, stouter; the perithecium uniformly dirty yellowish brown, rather strongly curved outward, the apex blunt, broad, without suffusions or other modification.

This form has been obtained from species of *Diopsis*; No. 859, Berlin Museum, from northern Kamerun, and No. 739, British Museum, from Port Natal.

Abundant material of the typical *R. crispatus* has been examined as follows: Nos. 2302, 2715, 2720, from Kamerun, and also from Port Natal, Usambara and Killimadjaro, East Africa, the last kindly communicated by Dr. Speiser. The species is most readily recognized by its erect stalk-cell and very different perithecium, the tip of which is characteristically modified and colored, as is represented in the original figure; l. c. plate LII, fig. 20.

***Rhizomyces cornutus* nov. sp.**

Receptacle yellowish; the basal cell subhemispherical, penetrating the host by a rhizoidal apparatus; the subbasal cell slightly broader than long, bearing the stalk-cell of the perithecium distally and the appendage distally and laterally. Appendage erect, or slightly divergent; its axis consisting of about twelve cells; the basal small and nearly opaque, the rest becoming yellowish with a brownish tinge, the distal one paler and smaller, all bearing single external branches superposed in a single series, that from the basal cell lacking or abortive; the rest, except at the very tip, fertile, consisting of two cells; a basal bearing above, next the axis, usually two antheridia, and externally a somewhat elongate subbasal cell in which the lumen is nearly obliterated, usually slightly curved inward and bearing externally a series of four or five slightly curved, simple, closely set, rather short and

stout yellowish brown branchlets. Stalk-cell elongate, stout, nearly uniform; basal cell region abruptly distinguished, rich amber-brown, concolorous with the perithecium, its cells thick-walled, somewhat prominent, and surrounding the base of the ascigerous cavity; the two lower tiers of wall-cells distinguished by a slight indentation, the corresponding regions slightly inflated and marked by fine transverse lines; the second tier narrower below the well distinguished tip which is more or less symmetrically inflated, forming a rounded collar subtending the clearly distinguished paler apex; which is somewhat longer, very slightly bent outward, bearing a short, stout, bluntly pointed, two-celled, tooth-like outgrowth from the lower half of its inner margin. The whole perithecium, including the basal cell region, slightly curved outward. Perithecia, including basal cell region, $135-140 \times 35-40 \mu$. Stalk-cell $280-350 \times 22 \mu$. Appendage $185-195 \mu$; the branch-axis 18μ , the branchlets 18μ . Receptacle $28 \times 20 \mu$. Total length to tip of perithecium $400-525 \mu$.

On the inferior tip of the abdomen of *Diopsis* sp. No. 2301, Kamerun, W. Africa.

Allied to *R. circinalis* and *R. gibbosus*, but differing from both in the characters of its perithecium and appendage.

***Rhizomyces gracilis* nov. sp.**

Erect, very long and slender; foot normal. Basal cell of the receptacle broader than long, somewhat smaller and broader than the subbasal, obliquely prominent below the base of the appendage; subbasal cell longer than broad, its axis divergent, distinguished externally by a slight constriction above and below. Appendage consisting of about seventeen hyaline cells, erect, slightly exceeding the tip of the perithecium, its basal cell small and subtriangular, obliquely adjusted to the receptacle, the two cells above it hardly larger, the rest for the most part large, slightly more than twice as long as broad, except one or two of the distal ones; the branches of the appendage similar to those of *R. confusus*, consisting of five or six dark hyaline-tipped, outcurved, closely set branchlets, which arise in a vertical series from a short dark unicellular inwardly hyaline axis, in most cases subtended by a small hyaline cell bearing two or three slender antheridia; the small terminal cell of the axis bearing distally two or three similar erect branchlets. Stalk-cell of the perithecium stout, hyaline, erect, gradually broader distally; the secondary stalk-cell and the basal

cells relatively large and well defined, one of the latter (?) extending from the stalk-cell to the base of the perithecium and slightly spiral; perithecium concolorous with the secondary stalk- and basal cells, yellow with a tinge of brown, the wall-cells of the venter- and neck-regions slightly spiral, and transversely punctate, the whole tapering with a slight bend to the bluntly rounded apex. Perithecium $60 \times 22 \mu$; including basal cell region 88μ . Stalk-cell $284 \times 15 \mu$ distally. Receptacle about $25 \times 14 \mu$. Appendage to tip of terminal branchlets 350μ ; its lateral branches about 50μ . Total length to tip of perithecium 355μ .

On a species of *Diopsis*, Killimandjaro, East Africa.

This very graceful and distinct species was found in company with *R. crispatus* on a host kindly communicated by Dr. Speiser. It is most nearly allied to *R. confusus*. The branches of the appendage are shorter and less curled, and are more remote, tending to diverge in such a way as to appear grouped in threes. The perithecium of the unique type is not fully mature, and may perhaps become slightly modified with age, although asci are already formed.

Rhizomyces Kamerunus nov. sp.

Cells of the receptacle nearly equal, hardly longer than broad, the subbasal more deeply tinged with brown. Appendage suberect, or usually curved toward the perithecium, its axis indeterminate, consisting of from ten to twenty cells tinged with brown, except the terminal ones; the lower darker, especially the smaller basal and subbasal cells which may be nearly opaque; the cells above them slightly longer than broad and bearing each a branch distally and externally, the upper sterile, the rest bearing from their basal cells a hyaline triangular cell from which two or three long-necked brown antheridia arise; the rest of the branch clavate, blackened, except the inner side of its subhyaline somewhat swollen termination, bearing externally and distally two to five slightly curved branchlets, blackish with hyaline slightly enlarged tips; the successive branches diverging slightly, so that the series as a whole is more or less distinctly two-ranked. Stalk-cell of the perithecium arising terminally from the subbasal cell, usually curved near its base, so that the perithecium diverges more or less strongly, although it is sometimes erect; its base narrower, gradually enlarging to the distal end, subhyaline or becoming tinged above with yellowish brown; the basal cell region

well defined, yellowish brown, concolorous with the rather stout perithecium, which is subsymmetrical, somewhat straighter on the outer side, rather evenly inflated throughout, and tapering to the hardly distinguished, blunt or almost truncate tip and apex, a small outer lip often forming a rather abrupt hyaline prominence. Spores about $22 \times 2.5 \mu$. Perithecia $75-80 \times 25 \mu$; stalk-cell $35-50 \times 11 \mu$. Appendage, longest axis, 175μ ; branches $70-100 \mu$. Receptacle about $22 \times 8 \mu$. Total length to tip of perithecium $140-160 \mu$.

On the anterior legs of a large black *Diopsis*. No. 2302, Kamerun, W. Africa.

This species is most nearly related to *R. confusus* and is of the same general type, but has little of its graceful appearance owing to the fact that its peculiar branchlets are coarse and more scanty and hardly more than curved at the tips. Owing to a slight divergence in their origin from successive cells they tend to be two-ranked. The perithecium also differs in being straight, or nearly so; and its stalk-cell is not subtended by the prominence characteristic of *R. confusus*. The axis of the appendage resembles that of an undeveloped *Rhachomyces*.

Ilytheomyces falcatus nov. sp.

More or less conspicuously curved throughout. Basal cell abruptly prominent below the insertion of the appendage, almost wholly involved by the suffusion of the foot; subbasal cell larger, lying obliquely beside and above it, hyaline. Axis of appendage divergent, consisting of four or five hardly distinguishable cells, blackened externally; the subbasal cell abruptly broader than the basal, and bearing on its inner side the relatively large partly free androphorous cell from which arises a single antheridium and a well developed branch, usually bearing several stout curved hyaline-tipped branchlets; the remaining cells of the axis bearing externally blackish brown, out-curved, hyaline-tipped branches, and on the upper side a few stout curved hyaline branches, tinged with brown and more slender below. Stalk-cell of the perithecium hyaline, rather short, distally obliquely separated from the much longer secondary stalk-cell, which lies parallel to the narrower inner basal cell: the latter of about the same length, but reaching higher, its narrow base in contact with the stalk-cell. The stalk- and basal cell regions about as long as the rest of the perithecium, the two lower tiers of wall-cells and the third (tip) distinguished by very slight elevations, purplish brown, the surface mottled-granular,

the tip slightly darker; the apex slightly narrower, paler, tapering very slightly; the outer lip-cell darker purplish brown, spreading slightly distally to form an oblique snout-like termination. Spores about $25 \times 2.5 \mu$. Perithecium $55-68 \times 15-18 \mu$; stalk- and basal cell region $35-50 \times 15 \mu$. Appendage about 50μ , its longest branchlets $40 \times 6.5 \mu$. Total length to tip of perithecium $100-120 \mu$.

On the superior surface of the abdomen, near the tip, of *Ilythea* sp. No. 2643, Kamerun, West Africa.

This form is not nearly allied to any of the described species. Among those which, as in this instance, lack a trigger organ, *Ilytheomyces major* perhaps approaches it most nearly; but it is very clearly distinguished by the peculiar form of its punctate perithecium and its snout like termination formed by the protrusion of the wholly suffused outer lip-cell. The specimens examined are mostly paired so that the details of the appendages, two of which are thus juxtaposed, is difficult to make out in detail. The upper branchlets are peculiar for their narrower deeply suffused bases, and curved or winding hyaline terminations. The androphorous cell is unusually large and prominent, as is the sterile branch developed from it.

***Ilytheomyces Kamerunensis* nov. sp.**

Basal cell relatively large, wholly hyaline, four sided, bulging strongly externally; subbasal cell subtriangular, much smaller, bulging somewhat externally and becoming edged with black below and externally, the blackening continuous with the foot. Appendage much as in *I. Sarawakensis*, the branchlets slightly stouter, the basal and subbasal cells much smaller and indistinguishable, the antheridia paired, stout, straight and brown; several well developed secondary branches arising from the upper side of the successive cells of the main axis, which is somewhat more divergent. Stalk-cell of the perithecium small and narrow, wholly opaque; the basal cell region above it hyaline, abruptly much broader, monstrously developed, becoming much longer than the perithecium proper; slightly curved outward, of nearly uniform width, or slightly broader distally; the secondary stalk-cell black-edged just above the much narrower stalk-cell, occupying approximately the lower two thirds of the region, and distinguished from the outer basal cell above by a well defined indentation; the inner basal cell extending to its base, its upper half concealed by a slight general twist of the region which is continued by

the body of the perithecium; the latter purplish brown deeper above, with darker longitudinal lines which indicate corresponding elevations of the wall-cells of the lower tier, the lumina of which, when they appear at the margins, are distinct; the tip darker, not distinguished; the apex abruptly narrower; the lips hyaline and somewhat irregular; the trigger-appendage relatively stout, narrow and geniculate opposite the lips, then erect and curved outward distally, reddish brown, with a blunt hyaline tip; the whole perithecium proper rather abruptly bent in the middle. Spores about $20 \times 2.5 \mu$. Perithecia $63-70 \times 17 \mu$; trigger-appendage $100-110 \times 8 \mu$; basal cell region $90-100 \times 18-20 \mu$; stalk-cell of perithecium $8 \times 8 \mu$. Receptacle 15μ . Appendage $56-68 \mu$. Total length to tip of perithecium $140-175 \mu$.

On the inferior surface of the abdomen of *Ilythea* sp. No. 2643, Kamerun.

This species is remarkable for the monstrous development of the basal cell region and is quite distinct from *I. Sarawakensis*, its nearest ally, in several other respects. The wall-cells of the lower tier of the perithecium are each slightly folded outward, forming a rather narrow elevation indicated at the sides by a clearly defined lumen and between the margins by two parallel lines, the included area faintly punctate, but not conspicuously distinguished.

Ilytheomyces Sarawakensis nov. sp.

Similar to *I. elegans*. Lower portion of the basal cell combined with the foot and indistinguishable from it, opaque black-brown, except its perfectly hyaline upper anterior angle, which bulges out abruptly below the insertion of the appendage: subbasal cell wholly opaque, not prominent externally, the upper half of its inner margin in contact with the base of the appendage, its base horizontal. Axis of appendage strongly divergent and slightly curved outward; the basal and subbasal cells opaque and indistinguishable; the androphorous cell bearing two straight, paired, brown antheridia, one of which may be replaced by one or more erect sterile branches; the third cell usually producing a well developed branch on the upper side, the base of which lies close against the base of the antheridia, its axis consisting of four or five cells each of which bears from two to three branchlets which, together with those arising from both sides of the main axis above it, form a rather dense tuft; the outer branches of the main axis deeply blackened, the blackening extending to a distal point

where it is obliquely separated from the subvesicular hyaline tip. Stalk-cell of the perithecium opaque like the subbasal cell below it, short, distally broader; secondary stalk-cell hyaline above and within, its basal half or third distinguished by an obliquely separated, subtriangular opaque area; basal cells quite hyaline, or the strongly convex wall of the smaller outer one slightly brownish; the inner very large and bulging toward the appendage, that on the left even intruded between the adjacent antheridia and branchlets of the appendage, that on the right less prominent. Perithecium slightly curved outward, the lower part of the ascigerous cavity surrounded by the basal cells, the outer lower wall-cell prominent, with more or less distinct lumen; the outer smaller half of the region of the two first tiers hyaline and obliquely separated, owing to a slight twist, from the larger inner half, which is increasingly suffused with slightly reddish brown from below up; the tip somewhat broader than long, distinguished by its uniformly somewhat darker color, especially its outer margin, which forms the base of the well developed trigger-organ, developed from the outer lip-cell, which is stout, its base erect, geniculate opposite the lips, thence erect, but soon curved rather abruptly outward and somewhat stouter, wholly brown, deeper below; the hyaline tip tapering slightly: the apex longer and paler than the tip, blunt with perfectly hyaline rather prominent vesicular lips. Spores about $22 \times 2.5 \mu$. Perithecia to base of ascigerous cavity $50-75 \times 14-20 \mu$; trigger-appendage $50-75 \times 6 \mu$; basal and stalk-cell region $20-35 \times 18-22 \mu$. Receptacle $10 \times 12 \mu$. Appendage $50-60 \mu$. Total length to tip of perithecium $100-120 \mu$.

On the inferior surface of the abdomen of *Ilythea* sp. No. 2132, Sarawak, Borneo.

This species is very closely allied to *I. elegans* of which it may prove to be only a variety. The subbasal cell is wholly opaque from the first, and uniform with the stalk-cell, which does not show the same abrupt differentiation; the stalk and basal cell region is greatly developed and very broad, the perithecium is shorter and broader. A large branch arises from the axis of the appendage on the upper side just beside the large straight antheridium, which is usually almost as highly developed as the axis itself; the external branches being longer and less deeply blackened. The branchlets as a whole are very copious and not closely appressed. A dozen or more specimens have been examined which show no essential variations.

***Ilytheomyces simplex* nov. sp.**

Perithecium and appendage dark brown. Basal cell of the receptacle united to the foot, minute, hardly distinguishable, except its hyaline upper edge: subbasal cell small, hyaline. Appendage stout, subclavate, with a short terminal abortive branch; its axis consisting of five cells of somewhat unequal size; a small androphorous cell obliquely separated from the second on the inner side; in the types bearing only a single short branch bent downward, a similar sterile branch, arising from the cell above, runs parallel to it. Stalk-cell of the perithecium short and stout, hyaline, the basal cell region hyaline, or tinged with brownish above; the secondary stalk-cell somewhat prominent externally. Perithecium dark brown, asymmetrical, distally bent, somewhat inflated below in the region of the two lower tiers of wall-cells; the third tier (tip) short, somewhat darker; the apex abruptly very slightly narrower, slightly paler; the termination broad and somewhat flattened, the lips appressed, not prominent. Spores $15 \times 2 \mu$. Perithecia, including basal cell region, $60 \times 18 \mu$. Appendage $35 \times 8 \mu$. Total length $90-97 \mu$.

On the legs of a species of *Ilythea*. No. 2131, Sarawak, Borneo.

This species is smaller than *I. anomalus* to which it is very nearly allied, and differs in the character of its appendage which is more clavate, and produces no external abortive branch; while on its inner side a short relatively slender simple branch arises from the third cell, only, bending somewhat downward beside a similar branch which arises from the androphorous cell. No antheridium appears to be developed from the latter in the two mature individuals examined. The perithecium is somewhat different in shape and structure, the stalk cell and basal cells much less well developed than in *I. anomalus*. An abortive male (?) individual is united to the foot of one specimen.

On Agromyzidae.***Stigmatomyces asymmetricus* nov. sp.**

Receptacle stout, thick-walled, tapering continuously to the apex of the pointed foot; the basal cell half or two thirds as long as the subbasal, rather strongly curved and paler, or hyaline; the subbasal cell becoming reddish yellow with rough granulation, especially distally, both septa horizontal. Stalk-cell of the appendage reddish amber-colored, not overlapping the receptacle, about twice as long as broad, somewhat prominently rounded below the deeply colored

basal cell of the appendage; which is hardly longer than broad, its axis consisting of four successively smaller cells; those above the basal paler, bearing each two antheridia, except the fourth, which bears but one, and is succeeded by a second which is terminal; the antheridia relatively short and stout, the necks turned usually sideways. Stalk-cell of the perithecium concolorous with that of the appendage, as are the cells above it, broader than long, distally in contact with the broad base of the inner basal cell; secondary stalk-cell wholly external to it, somewhat prominent, half as large, subtriangular, obliquely separated from it, as well as from the outer basal cell above; the latter more deeply colored, and prominent below the large deeply colored venter; which is asymmetrical, about twice as long as broad, distally broader, externally less convex, and distally conspicuously prominent, finely rough-granular, the wall-cells separated by slight furrows; the inner margin more or less evenly convex, the remainder of the perithecium almost exactly as long as the venter; the paler, abruptly distinguished neck tapering very slightly from its spreading base; the tip clearly distinguished, abruptly slightly narrower, tapering very slightly, the apex not distinguished, short, subhyaline, with slightly oblique inconspicuous nearly symmetrical papillate lips. Spores about $25 \times 2.5 \mu$. Perithecia $150-180 \times 40-45 \mu$. Receptacle $85-100 \times 25-28 \mu$. Appendage $46 \times 10 \mu$; its stalk-cell $25 \times 10 \mu$. Total length $250-280 \mu$.

On the abdomen of a small fly belonging to the Agromyzidae. Kamerun, No. 2283.

A species apparently allied to *S. Scaptomyzae*, distinguished by the peculiar modification of the subbasal cell of the receptacle, and the granular roughening of the venter of the perithecium, both of which characters become more prominent in older specimens.

***Stigmatomyces divergens* nov. sp.**

Subsigmoid, rather stout, rather dark red amber-brown, except the hyaline receptacle; which is shorter than the perithecium, the cells of about equal length, slightly curved. Basal cell of the appendage short and stout, strongly convex externally, deeply suffused with reddish brown, separated by a deep external constriction from the narrow base of the basal cell of the appendage, the axis of which consists of four cells; the basal about as broad as long, deeply suffused, bearing no antheridia; the three others bearing each two; the series

surmounted by two additional ones, the upper with a stout spine; the whole appendage relatively short and stout, diverging from the perithecium and free to its base; the antheridia turned sidewise, and distinctly tinged with brownish yellow, like the cells which bear them. Stalk-cell of the perithecium broader than long, the secondary stalk-cell much smaller, as are the basal cells; venter of the perithecium longer than the distal portion, its base hardly lower than the insertion of the appendage, evenly inflated, or more convex externally, merging distally with the neck; which is not abruptly distinguished, its outline more or less concave on both sides; the tip rather abruptly distinguished, tapering to the undifferentiated apex, which is five-lobed, the lobes rather prominent and somewhat irregular. Spores about $25 \times 3 \mu$. Perithecia $155-170 \times 42-50 \mu$. Appendage $42-48 \times 4 \mu$. Receptacle $80-100 \times 28 \mu$. Total length $250-280 \mu$.

On the head and at the base of the wing of a small dull fly belonging to the Agromyzidae. No. 2730, Kamerun, West Africa.

Although this species is not otherwise peculiar, it seems well distinguished by its somewhat divergent, short, stout appendage, the base of which is so narrow as to appear constricted, the basal cell dark colored and narrow, the cells above it much broader. It is perhaps more nearly related to *S. Drapetis* than to any other described form.

On Anthomyidae.

***Stigmatomyces macrandrus* nov. sp.**

Long and slender, straw-colored above the hyaline receptacle, with faint brownish shades near the base of the venter. Receptacle usually curved, of nearly uniform diameter throughout, the basal cell sometimes slightly broader, less than half as long as the subbasal, its base broad and rounded beside the small sublateral foot. Stalk-cell of the appendage slightly misplaced laterally on the right side, nearly twice as long as broad, externally rounded, distally, below the rather broad insertion. Appendage very slightly divergent, very long, reaching some distance beyond the venter, slender, tapering, slightly curved outward at the extremity; its axis consisting of seven or eight successively smaller cells; the basal cell slightly tinged with brown, somewhat longer than broad, the terminal cell minute, bearing a single antheridium, which is surmounted by a second terminating the appendage; all the remaining cells bearing two, obliquely superposed;

the necks somewhat curved, mostly free, relatively long and forming two incomplete rows. Primary and secondary stalk-cells of the perithecium subequal, so placed that they appear to overlap on the right and left sides, respectively; the basal cells relatively small, the outer slightly prominent. Venter straight, its axis coincident with that of the stalk-cell region and receptacle, slightly broader near the base; the neck concolorous, rather stout, slightly curved, nearly uniform throughout, very slightly enlarged at its junction with the abruptly slightly narrower tip; the apex somewhat shorter, hardly tapering, distinctly bent outward, the flat blunt termination with hardly prominent lips. Spores (in perithecia) about $30-35 \times 3.5 \mu$. Perithecia 190μ , the venter $70-75 \times 30-35 \mu$. Appendage $100-110 \times 16 \mu$. Receptacle $210-245 \times 21 \mu$. Total length to tip of perithecium $385-450 \mu$.

On a dark fly belonging to an undetermined genus of the Anthomyiidae. No. 2638, Kamerun.

This species is closely allied to *S. dubius*. None of the specimens, which include a number of very young individuals, show any signs of the conspicuous and permanent spine found in the last mentioned species. The snout-like, curved apex of the perithecium and the very slight enlargement below the tip, together with the minute, hardly indicated lips, seem further to distinguish it.

STIGMATOMYCES LIMNOPHORAE Thaxter.

The typical form of this species has been found on several flies from Kamerun belonging to the Anthomyiidae, Nos. 2640 and 2646 as well as others, while a large form that appears also to be identical with this species and may measure nearly 800μ in length has been received from Mr. Jacobson and was collected by him in Sumatra on *Lucilia* (?) and a similar form from the Philippines on *Lucilia dux* has been received from Mr. Banks. A closely allied form, which does not seem referable to any of the variations of *S. Limnophorae*, has been met with on an anthomyid fly from Kamerun and may be distinguished as follows.

Stigmatomyces tortilis nov. sp.

Form comparatively short and stout, slightly curved throughout, especially the neck, uniformly dirty yellowish brown above the hyaline receptacle; the subbasal cell slightly longer than the basal which

is but slightly narrower at its base and distally often slightly broader than the base of the subbasal cell. Stalk-cell of the appendage overlapping the subbasal cell slightly if at all, externally convex, more so distally, but not abruptly distinguished from the basal cell of the appendage; which is hardly more than twice as long as broad, the axis curved inward, with the antheridia external, and consisting of five subhyaline cells hardly longer than broad, except the basal, and bearing each two closely associated antheridia, the fifth bearing but one, a terminal single antheridium ending the series. Stalk-cell of the perithecium broader than long, more than half enclosed by the overlapping of the secondary stalk-cell on the left side and of the basal cell which lies above it on the right side; the basal cells subequal, somewhat prominent, as is the secondary stalk-cell; venter broader and slightly inflated below, tapering slightly; the wall-cells becoming finely granular; distally slightly prominent, the curved broad neck of about the same length, the wall-cells of both distinguished by a rather broad deep spiral furrow, continuous in the two, describing a complete turn ending at the abruptly narrower tip, which is subtended by a slight enlargement; apex not distinguished from the tip, the two slightly inflated, distally subtruncate, with somewhat irregular lips, the inner more prominent. Spores about $25 \times 3.5 \mu$. Perithecia $140 \times 32-35 \mu$. Appendage 60μ , its basal cell $14 \times 6 \mu$. Receptacle $80-90 \times 18-21 \mu$. Total length 225-250 μ .

On the abdomen of a fly belonging to the Anthomyidae. Kamerun, No. 2639.

Ten individuals of this form have been examined, which were found growing on the superior surface of the abdomen, where *S. Limnophorae* usually occurs, and where it reaches its most typical development. The differences which distinguish the present species are thus evidently not due to position of growth. The deep spreading furrows which traverse the venter and neck, and the strong curvature of the latter give it a very different appearance. Unlike *S. Limnophorae*, the appendage curves inward, and the antheridia are directed outward. The appendage is also more compact than is usually the case in *S. Limnophora*, although it is of the same general type.

*On Borboriidae****Stigmatomyces affinis* nov. sp.**

Hyaline below, pale yellowish above the stalk-cells; of rigid habit, straight or but slightly curved. Receptacle tapering from apex to base, the basal cell mostly somewhat longer, a smoky brown suffusion just above the small foot. Stalk-cells of the appendage and perithecium lying side by side in a horizontal series, not differing greatly in size, the secondary stalk-cell slightly smaller and higher; that of the appendage strongly rounded outward below the insertion, otherwise nearly straight externally; the axis of the appendage externally convex, consisting of usually eight cells; which are externally convex, somewhat obliquely superposed, and similar, except the small distal and the broader flattened amber-brown basal cell: the antheridia appressed, turned inward or sidewise, one from each cell (or two from the lower?); the upper three or four usually proliferating into short, stout, septate, simple filaments. Basal cells of the perithecium similar, extending above the base of the ascigerous cavity, the inner not extending lower than the outer: venter rather short and stout, more or less abruptly inflated just below the middle, above which it is concave below four variously conspicuous protrusions corresponding to the extremities of its four wall-cells; the neck thus abruptly differentiated, stout, tapering throughout to the short, abruptly slightly narrower tip and apex; the latter externally concave below a slight externally divergent, rounded termination, formed by two lip-cells, and subtended on the inner side by two papillae. Spores about $25 \times 3.5 \mu$ (in perithecium). Perithecia $95-105 \times 28-32 \mu$. Appendage about 50μ . Receptacle $35-50 \times 16 \mu$. Total length $150-175 \mu$.

On a minute species of *Limosina*. No. 2290, Kamerun, West Africa.

This species is most nearly allied to *S. Papuanus*, but seems clearly distinguished by the character of its perithecium and the position of its stalk-cells. The apex of the perithecium is similar to that of *S. papuanus*, but its terminal projection is relatively smaller, shorter and more rounded, and the subtending inner papillae are less prominent. *Stigmatomyces Platensis* Speg. (Revision de las Laboulbeniales Argentines, p. 677, fig. 208) approaches this species very closely but the figure and description are hardly sufficiently detailed to make an exact comparison. The two may prove variations of a single species.

Stigmatomyces Borbori nov. sp.

Basal cell of the receptacle tapering below or constricted in the mid-region, the subbasal cell broad and distinctly longer, of nearly uniform diameter, the margins somewhat convex. Stalk-cell of the appendage small, broader than long, slightly convex externally, the insertion relatively broad, lying opposite the middle of the primary stalk-cell. Axis of the appendage usually consisting of six cells; the basal contrasting yellowish brown, broader than long, nearly symmetrical; the rest hyaline, successively slightly smaller, externally abruptly convex, irregularly and broadly elliptical in outline, their axes horizontal, or but slightly oblique; the basal and subbasal cell bearing each four superposed antheridia, the third and fourth each three, all borne on the inner side of the appendage, obliquely superposed, and directed to the right; the fifth cell small, and associated with two abortive antheridia, one of them terminal, the tips of which are imperforate and vesicular. Stalk-cell of the perithecium free on both sides, longer than broad, distally separated obliquely from the secondary stalk-cell, which is about as long; the outer basal cell overlapping the ascigerous cavity throughout its length, and ending in an abrupt elevation a short distance below the middle of the body of the venter; the inner large and extending somewhat above the base of the ascigerous cavity, ending in a prominence similar to that of the outer, but much lower: the whole basal and stalk-cell region forming a well developed stalk of nearly uniform diameter, or with somewhat convex margins, the axis of which diverges from that of the receptacle and appendage, and coincides with that of the perithecium: venter yellowish, straight, slightly inflated; the wall-cells with a slight twist which involves the neck, ending in distinct elevations below which the margins are slightly concave, and clearly distinguishing the slightly spreading base of the hyaline, slightly curved neck; which tapers slightly, and is distinctly bent at its junction with the tip; the latter yellowish brown; the apex rather abruptly distinguished externally, distally relatively broad, oblique, and externally prominent; the lip-cells not individually distinguished. Spores $35 \times 4.5 \mu$. Perithecia $110-120 \times 35 \mu$. Appendage, including antheridia $56 \times 25 \mu$. Receptacle $65-68 \times 24 \mu$. Total length to tip of perithecium $200-240 \mu$.

On *Borborus* sp. No. 2732, Kamerun, West Africa.

A species most nearly related to *S. Borboridinus* from which it

differs in its more highly developed appendage, differently arranged stalk-cells, and by the oblique termination of its perithecium. The basal cells of the perithecium are also peculiar, ending in a small abrupt protrusion, the inner cell lying almost wholly against the ascigerous cavity.

***Stigmatomyces Borboridinus* nov. sp.**

Receptacle hyaline, the basal cell tapering to a narrow base, broader distally than the base of the subbasal cell; which is slightly more than half as long, short and broad, its margins somewhat convex. Stalk-cell of the appendage relatively short, its broad base somewhat oblique; externally oblique below the broad insertion, which lies opposite the upper end of the primary stalk-cell. Appendage consisting of three clearly defined yellowish brown cells, the basal somewhat darker and more reddish, slightly longer than broad, the subbasal smaller, more strongly convex externally, somewhat broader than long; both bearing three superposed relatively large antheridia on the inner side, their stout relatively long curved necks turned to the right, except the uppermost; the third cell smaller than the subbasal, somewhat oblique, followed by three antheridia which terminate the appendage; the distal, outer, one sometimes replaced by a small permanently sterile cell. Stalk-cell of the perithecium smaller than the cells above it, very obliquely separated from the secondary stalk-cell, which is about as large and long as the inner basal cell; the outer basal cell large, overlapping the ascigerous cavity, and twice prominent externally below the venter; the whole region forming a stout, well defined stalk. Venter, which comprises about half the total length of the perithecium and its stalk, pale brownish yellow, diverging at an angle of about 45° from the common axis of the receptacle and appendage; the former broader distally, hardly inflated; the wall-cells prominent and ending in conspicuous rounded projections, which abruptly distinguish the slightly spreading base of the relatively stout, nearly hyaline, short neck; the tip distinctly tinged with brownish yellow, well distinguished by a general inflation, its margins almost symmetrically convex, tapering distally to the short broad apex, the broad termination of which is almost symmetrically truncate, or slightly rounded, without projecting lips. Spores $36 \times 5.5 \mu$. Perithecia $100-120 \times 28-32 \mu$; the whole stalk-part, including the primary stalk-cell which is free only externally at its base, 35μ by 20μ above, by 14μ below. Appendage $42 \times 22 \mu$ including tips of antheridia. Receptacle $50-64 \times 17-20 \mu$ distally. Total length to tip of perithecium $190-210 \mu$.

On the legs of a fly belonging to the genus *Borborus*, or closely allied. No. 2734, Kamerun, West Africa.

This species, although related to the group of forms which occur on the borborid genus *Limosina*, differs in the characters of its appendage which closely resembles that of *S. Borbori*, although somewhat less highly developed. The nine large antheridia are closely grouped, with prominent necks. The perithecium is straight, or very slightly bent distally, its axis coincident with that of the basal and stalk-cell portion which diverges at a characteristic angle from that of the receptacle and appendage. Ten individuals have been examined.

***Stigmatomyces contortus* nov. sp.**

Hyaline; the stalk-cells, and apparently the inner basal cell, forming a rather slender perithecial stalk, against which the receptacle is abruptly bent, so that the foot lies near the base of the venter, the appendage projecting free from the point of abrupt curvature. Basal cell of the receptacle abruptly curved and tapering somewhat below, the subbasal somewhat longer and stouter. Stalk-cell of the appendage viewed endwise, its axis tinged with brown, projecting upward and backward away from the receptacle and perithecial stalk: (appendage in young individuals borne on a stalk-cell which is rounded and nearly isodiametric, strongly convex below the insertion): consisting of four axis-cells, the basal rounded, somewhat flattened, brown, bearing a small somewhat flattened androphorous cell, which occupies most of its distal surface and bears three antheridia, the rest of the axis diverging from it at an angle of more than 45° , the three successively smaller cells very obliquely superposed, strongly convex externally, and separated by deep constrictions; the lowest (sub-basal) but slightly united to the basal, bearing two antheridia, the second two, and the third one; which is surmounted by a normal antheridium, while a small terminal cell also functions as an antheridium by developing a neck from the middle of its inner side at right angles to its long axis. The stalk-cells, and apparently the inner of the basal cells of the perithecium, forming a relatively slender perithecial stalk, of nearly uniform diameter, but irregular outline, which is separated by a well marked constriction from the base of the venter: the latter broadly inflated below, owing largely to the overlapping basal cells; which extend upward beside it for some distance, tapering to the hardly distinguished, broad, irregular, slightly curved neck;

the tip distinguished by a slight indentation, and subtended on the concave side by a stout, blunt, irregular, tapering outgrowth from one of the neck wall-cells; the apex hardly distinguished, short, blunt bent slightly upward, one of the lip-cells prolonged to form a well developed stout, terminal appendage of nearly uniform diameter, slightly geniculate at its base, and distally roundish-truncate. Spores $32 \times 3.5 \mu$. Perithecia $110 \times 35 \mu$; its stalk-portion $38 \times 17 \mu$; its terminal appendage $20 \times 8 \mu$; the lateral one $18 \times 14 \mu$ at base. Receptacle $45-50 \times 15 \mu$. Appendage in young individuals about $40 \times 9 \mu$.

On the wings of *Borborus* sp., or a genus closely allied. No. 2732, Kamerun, West Africa.

This species is quite unique, owing not only to the fact that it is abruptly bent upon itself, but to the presence of two outgrowths from the perithecium. Three fully mature individuals have been examined and numerous younger specimens.

***Stigmatomyces divaricatus* nov. sp.**

Rather long and slender with irregular outline, nearly hyaline, the appendage and the perithecium, with its stalk, almost symmetrically divergent at somewhat more than a right angle from the receptacle; which is usually more or less uniform in diameter, broader at the septum, the basal cell sometimes hardly half as long as the subbasal, usually rather strongly curved below. Stalk-cell of the perithecium relatively short, the base broad, somewhat oblique, the distal half free, broader and usually symmetrically convex; the appendage consisting of about six cells; the basal pale yellowish brown, sometimes twice or even three times as long as broad, and of uniform diameter, or somewhat broader distally; the three following cells similar, but successively considerably smaller, separated by constrictions: the narrow subbasal cell twice as long as broad; usually slightly concave externally; the one or two small distal cells somewhat irregular, the uppermost sterile: the basal and subbasal cells bearing each three, the third and fourth each two, antheridia; those above the basal cell subtended by a rounded cell which occupies almost the total diameter of the axis; the fifth cell followed by two small abortive antheridia which separate it from a small sterile terminal cell; the antheridia relatively rather small, directed inward and to the right, their necks somewhat irregularly divergent. Stalk-cell of the peri-

thecium united to the lower half of that of the appendage, but otherwise wholly free on both sides; sometimes nearly twice as long as broad, externally slightly concave, prominent below the outer basal cell, which is in contact throughout with the base of the ascigerous cavity, its apex forming a distinct prominence; the inner long and narrow, ending somewhat lower in a similar prominence and extending down to the stalk-cell. Venter irregular, slightly inflated, the wall-cells ending distally in distinct prominences, and showing a slight twist which involves the neck and tip: the neck relatively stout, slightly curved, hardly distinguished, except by the subtending prominences; the tip subtended by slight depressions on either side, its margins convex, abruptly so on the inner side, so that the short apex is subtended by a rather prominent hunch; distal margin of the apex broad, outwardly oblique, and nearly straight, the lip-edges not at all prominent. Spores $40 \times 5 \mu$. Perithecia $120-135 \times 28-32 \mu$; the stalk-portion about $68 \times 18 \mu$. Appendage $75-86 \mu$, the stalk-cell $18 \times 14 \mu$. Receptacle $112-130 \times 18-24 \mu$. Total length $280-315 \mu$.

On *Borborus* sp. No. 2732, Kamerun, W. Africa.

This species is very closely allied to *S. Borbori*, although very unlike it in general appearance, and may possibly prove to be an abnormal development of the latter. Apart from its elongate form, the chief difference is found in the appendage, the principal cells of which are longer than broad, instead of the reverse, the basal separating a well marked androphorous cell bearing three superposed antheridia. About a dozen examples have been examined, none of which seem to vary toward *S. Borbori*. The hosts appear to belong to the same undetermined species of *Borborus*.

Stigmatomyces distortus nov. sp.

Strongly curved throughout, hyaline becoming tinged with pale yellowish, the venter darker brownish yellow, the appendage dull brownish below. Receptacle very slightly broader at the horizontal septum, the basal somewhat longer than the subbasal cell, slightly narrower above the foot, the subbasal broader distally, slightly concave on one or both sides. Stalk-cell of the appendage short, slightly broader distally than the broad insertion, which lies hardly higher than the distal margin of the perithecial stalk-cell. The appendage turned obliquely across the basal cell region; consisting of four persistent cells, the two lower relatively large, subequal, brownish, termi-

nated by one or two small evanescent hyaline cells (or antheridia ?); the outer margin nearly straight, the antheridia single appressed. Stalk-cell of the perithecium squarish, about as large as the stalk-cell of the appendage which lies beside it, hardly overlapped by the externally convex and somewhat longer secondary stalk-cell, below which it is somewhat prominent, in distal contact with the base of the vertically elongate narrow inner basal cell; the three external cells of the region separated by distinct indentations, the basal cell region abruptly somewhat narrower; venter somewhat asymmetrical, broader distally where it is usually more prominent, or bears an abrupt elevation on the inner side, abruptly distinguishing the distal portion, which is irregularly bent in a subsigmoid curve; the neck, tip and apex not distinguished, tapering distally, and ending in a short, bluntly rounded, finger-like projection formed on the inner side by one of the lip-cells, the others forming slight prominences below it, irregularly placed. Spores $34 \times 3.5 \mu$. Perithecia $85-100 \times 26-28 \mu$, its projection $10 \times 5 \mu$. Receptacle $40-50 \times 14 \mu$. Appendage about 50μ . Total length about 150μ .

On the head of *Limosina punctipennis* Wied. No. 2653, Kamerun, West Africa.

This species does not correspond closely to any of the other forms which occur on Borboridae, and is well distinguished by its strongly arcuate habit and terminal process. The cells of the appendage are not externally convex, and in all but a few of the specimens examined only the four lower cells remain. The distal portion of the appendage appears to become rapidly disorganized, and where it still persists it is not clear which of the cells present are axis-cells and which are antheridia.

***Stigmatomyces laticollis* nov. sp.**

Nearly hyaline, the perithecia slightly suffused. Receptacle relatively short, the cells subequal, separated by a slightly oblique septum; the basal somewhat narrower below, its anterior margin distally rather strongly convex, its axis forming a slight angle with that of the subbasal cell. Stalk-cell of the appendage somewhat larger than that of the perithecium which lies beside it; externally slightly convex throughout, more strongly so below the narrow insertion which lies slightly higher than the end of the primary stalk-cell. Axis of the appendage consisting of about seven to nine cells; the basal small, brown, flattened, distally broader; the subbasal nearly as large or

even larger, externally somewhat convex, the rest successively somewhat smaller and externally abruptly convex, somewhat obliquely superposed; two or three of the terminal ones slightly proliferous, the rest bearing appressed antheridia, usually turned inward. Primary stalk-cell of the perithecium somewhat exceeded above and below by that of the appendage; secondary stalk-cell subtriangular, placed somewhat higher, and obliquely separated; the basal cells about as large, the outer often abruptly convex externally: venter asymmetrical, distally broader; the wall-cells with a distinct spiral twist, distally cushion-like, and forming broad prominences, the outer lower: the distal portion of the perithecium undifferentiated, stout, of nearly uniform diameter throughout, the broad bluntly rounded apex bent outward. Spores about $18 \times 2.5 \mu$. Perithecia $100-105 \times 28-32 \mu$ (venter) $\times 14 \mu$ (distal portion). Appendage about $40-50 \mu$. Receptacle $40-50 \mu$. Total length to tip of perithecium $150-175 \mu$.

On tip of abdomen of *Limosina* sp. No. 2739, Kamerun, W. Africa.

A species somewhat similar to *S. affinis* in the conformation of its venter, but differing in its longer basal cell region, and stout uniform distal portion, ending in a curved bluntly rounded broad apex.

Stigmatomyces Limosinoides nov. sp.

Nearly hyaline or yellowish, with a slight general sigmoid curvature, the perithecium tinged with yellowish brown. Receptacle rather long, curved below, the convexity anterior; the basal cell tapering slightly to the faintly suffused yellowish base; the subbasal cell longer stouter, distally more or less distinctly inflated below the two parallel vertically elongated stalk-cells, the combined bases of which are somewhat narrower. Stalk-cell of the appendage more than twice as long as broad, slightly longer than that of the perithecium, rather prominently rounded below the insertion, which lies slightly higher than the end of the perithecial stalk-cell: the axis of the appendage tapering, consisting of six to eight cells, the basal small, short, clear amber-brown, the rest rounded, somewhat flattened, strongly convex externally, successively smaller, all but the two or three terminal ones bearing appressed antheridia, the lower superposed in pairs; the uppermost cells small and sterile. Secondary stalk-cell about twice as long as broad, similar to the primary, but slightly shorter, lying wholly above it, its base and that of the inner basal cell coincident and slightly oblique: basal cells relatively large, surrounding the rather long nar-

row base of the ascigerous cavity; the inner somewhat larger than the primary stalk-cell, to the upper half of which it is somewhat obliquely united; the outer larger, lying wholly above the secondary stalk-cell; which is somewhat smaller, externally convex; the stalk- and basal cells forming an erect or slightly divergent stalk-region, narrower below and distally broader than the venter of the perithecium. Venter yellowish brown, nearly symmetrical, subelliptical, thick-walled, erect, or slightly tilted inward; the neck broad, not abruptly distinguished, longer than the venter, tapering but slightly; the short tip sometimes slightly inflated, and distinguished by an inconspicuous external depression; the apex subtruncate, abruptly compressed below the hyaline, somewhat irregularly prominent, small, papillate lips. Spores $25 \times 3.5 \mu$. Perithecia $110-125 \times 35-42 \mu$. Receptacle $100-130 \times 18-22 \mu$. Appendage $50-60 \mu$. Total length $225-300 \mu$.

On the posterior legs of *Limosina punctipennis* Wied. No. 2133 and 2130, Sarawak, Borneo.

This species is more nearly related to *S. Papuanus*, from which it is at once distinguished by its short stout neck and broad blunt termination. What appears to be a variety of the same form was also obtained from the same locality (No. 2185) on the abdomen of a minute species of *Limosina*, several infested specimens of which have been examined. This variety is much smaller, measuring from $150-175 \mu$; the spores about $18 \times 2.5 \mu$. The stalk- and basal cells of the perithecium are hardly longer than broad and the latter do not appreciably overlap the ascigerous cavity. The lips of the perithecium are not so clearly defined, but there seem to be no well defined characters by which it could be specifically separated. In almost every specimen of the type-form a spore is protruding from the pore, and, diverging slightly, might well be taken for a spinous process.

STIGMATOMYCES PAPUANUS Thaxter.

This species has been found on numerous flies from Kamerun, belonging to the Borboridae, under the following numbers: 2291, 2292, 2640, 2670, 2672, 2673, 2675, 2736, 2737, 2739, 2740 and 2741. Its variability is considerable, but is usually associated with differences in the size of the perithecia, which may be due in part to variations in the hosts and in part to differences in the position of growth. The total length of fully matured individuals may vary from 175μ

to 600 μ , these differences being largely due to variations in the length of the perithecial neck, which may be very long and slender or short and very stout. The prolongation of the outer lips to form an obliquely pointed apex is always characteristic. The *S. Italicus* of Spegazzini, which is also said to occur on Borboridae, does not appear to differ in any respect from smaller forms of this species. It does not appear to occur in the Western Hemisphere where it is replaced by other allied forms which occur on members of the same family.

***Stigmatomyces platystoma* nov. sp.**

More or less curved throughout, or the extremity, only, curved outward. Receptacle hyaline; the basal cell narrower below, usually somewhat longer and distally broader than the subbasal cell, the posterior walls much thicker, the margins individually somewhat convex; the subbasal somewhat prominent below the stalk-cell of the appendage; which is pale brownish yellow, small, externally somewhat concave, abruptly broader and prominent below the insertion; which is opposite the distal margin of the perithecial stalk-cells. Axis of the appendage consisting normally of seven cells; the basal and subbasal nearly equal and more deeply suffused with yellowish brown, their margins but slightly convex; those above successively slightly smaller; all strongly convex, the septa but slightly oblique; each of the four lower cells producing two superposed antheridia on the inner side; the upper seated on the under, and furnished with a longer, more conspicuous, stout, appressed neck; the fifth cell bearing a single antheridium, the terminal cell distally inflated and partly free; the subterminal bearing an abortive antheridium, which may proliferate, producing a few clavate branchlets. Stalk-cell and secondary stalk-cell of the perithecium hardly longer than broad, the latter asymmetrically and obliquely overlapping two thirds or more of the former, on its left side; the basal cells smaller, subtriangular: venter tapering to a narrow base, sometimes twice as broad distally, slightly longer than the distal portion; the neck with abruptly distinguished spreading base, its outline somewhat irregular, hardly tapering, short; the tip and apex distinguished by an abrupt constriction, somewhat inflated; the tips of the four coarse lip-cells bluntly rounded and prominent about the pore: the wall-cells developing a slight spiral twist which is usually inconspicuous. Spores $30 \times 3.5 \mu$. Perithecia 85-100 μ ; venter 45-55 \times 30-32 μ distally

and $16\ \mu$ at base; the apex about $20 \times 12\ \mu$. Appendage $55\text{--}65\ \mu$. Receptacle $42\text{--}44 \times 15\ \mu$. Total length to tip of perithecium $155\text{--}160\ \mu$.

On the legs of *Limosina punctipennis* Wied. No. 2653, Kamerun, W. Africa.

This species is most nearly allied to *S. proliferans*, the appendage being similar and occasionally showing a similar proliferation distally. In other respects, however, its appearance is very different, owing to its short receptacle, distally expanded venter, and larger, abruptly distinguished, somewhat inflated apex.

***Stigmatomyces proliferans* nov. sp.**

Usually straight and rather slender, pale yellow, especially the venter; the receptacle hyaline; the base of the appendage tinged with amber-brown. Receptacle usually comprising nearly half the total length, the basal and subbasal cells of nearly equal diameter, the latter often slightly longer, and distally somewhat broader than the region immediately above it. Stalk-cell of the appendage relatively small, but slightly longer than broad, externally straight, or slightly concave, slightly and abruptly prominent below the rather broad insertion, which lies somewhat lower than the base of the ascigerous cavity; axis of the appendage consisting of usually seven obliquely superposed, successively smaller cells; the uppermost forming a minute erect, free, blunt projection; the basal cell hardly longer than broad, tinged with amber brown, the outer margin nearly straight, that of the three cells above it very strongly convex; all, except the uppermost, bearing single antheridia on the inner side, which are appressed and very obliquely superposed in a single row, long and slender, the neck and venter hardly distinguished; the upper two or three, including also the minute terminal cell, finally proliferous, producing partly dichotomous slender rigid branches, which form a variably developed coralloid group, their tips swollen and eventually separated (as sperm cells?) in a gelatinous mass. Stalk-cell and secondary stalk-cell of the perithecium longer than broad, overlapping laterally, nearly equal, the latter higher; the basal cells almost as large, and overlapping the ascigerous cavity above, the outer externally concave, and distally slightly prominent. Perithecium erect, rather slender, the distal portion somewhat longer than the slightly inflated venter, which tapers rather abruptly above

to the not abruptly differentiated neck; the latter of nearly uniform diameter, and distinguished from the almost equally broad tip and apex by a very slight elevation; the apex, seen sidewise, abruptly truncate distally; broad, flat, more prominent externally; or, if turned one quarter, tending to appear truncate-conical: the wall-cells of the venter and neck becoming more or less clearly spirally twisted from left to right. Spore $30 \times 3.6 \mu$. Perithecia $140 \times 30 \mu$ (venter) $\times 14 \mu$ (neck). Appendage $50-55 \mu$; to tip of proliferous branches $70-80 \mu$. Receptacle $120-140 \times 18 \mu$. Total length to tip of perithecium $280-315 \mu$.

On the thorax of *Limosina punctipennis* Wied. Nos. 2733 and 2287, Kamerun, West Africa.

This species, which belongs to the group of *S. Limosinae*, is clearly distinguished by its straight slender form, spiral wall-cells, and proliferous appendage. The minute bodies which are separated from the tips of the ultimate branches of these proliferations, and which finally cohere in a viscous mass, appear to be abnormally developed sperm cells, but their origin is quite unlike that of other known forms having exogenous sperms.

Stigmatomyces tortimasculus nov. sp.

Short and rather stout, or more elongate and slender; nearly hyaline except the faintly brownish yellow venter of the perithecium. Receptacle variably elongate, tapering slightly to the usually curved base. Stalk-cell of the appendage evenly and slightly convex throughout, or somewhat concave below, distally abruptly broader than the narrow insertion, which lies slightly higher than the base of the ascigerous cavity. Axis of the appendage somewhat irregular, curved, and lying sidewise against the venter; consisting of five cells, the terminal one minute and forming a short blunt projection from the base of the two distal antheridia; the basal cell relatively small, distinctly yellowish brown, as broad as long; the second and third longer, nearly equal; the fourth smaller; all bearing usually two antheridia, the distal ones somewhat clustered, the long free necks variously curved and irregularly divergent in different directions. Stalk-cell of the perithecium five-sided, broader than long, the secondary stalk-cell obliquely separated from it, externally strongly convex; the basal cells small and triangular. Venter of the perithecium variable, often relatively large, short and strongly inflated, much broader than the

basal cell region; the neck stout and slightly tapering, its spreading base rather clearly distinguished by a slight subtending elevation; the apex not distinguished, strongly oblique distally, or, when viewed radially, abruptly truncate, broad and bipapillate, the papillae closely associated and median. Spores $20 \times 3.5 \mu$. Perithecia $88-100 \times 32 \mu$, largest $120 \times 35 \mu$. Receptacle $42-75 \times 12-14 \mu$, largest $130 \times 14 \mu$. Appendage about 35μ . Total length $150-200 \mu$, longest 275μ .

On a species of *Limosina*, the larger on the thorax, the smaller on the legs. Nos. 2130, 2134, and 2135, Sarawak, Borneo.

This pale and otherwise nondescript form is most clearly distinguished by the irregular curvature and divergence of the long antheridial necks, which sometimes recall the appearance of the projecting fingers of the conventional scarecrow. It is evidently related to the simpler forms which occur on other borborids.

STIMATOMYCES VENEZUELAE Thaxter.

A form corresponding in all respects to the type, has been obtained from flies belonging to the genus *Limosina*, or to one very closely allied, growing on the abdomen; No. 2674, Kamerun, West Africa, and No. 2179, Sarawak, Borneo. As in the type material, the appendage appears to be somewhat evanescent, consisting of three well defined cells, the basal brownish yellow and somewhat broader than long. The basal as well as the subbasal cell, which is strongly convex externally, appear to bear two antheridia, as well as the third, but since the antheridia are turned sidewise and none of the specimens are young, it has been impossible to determine this point with certainty. The fourth cell appears to bear a single antheridium, and to be followed by two others which are terminal and superposed. The peculiar form of the venter and receptacle is exactly that of the Venezuela specimens.

On Diopsidae.

Stigmatomyces arcuatus nov. sp.

Rather evenly arcuate, the general curvature sidewise to the right, the curvature at the extremities usually somewhat more abrupt: uniformly suffused with yellowish; the perithecium and appendage

tinged with reddish. Basal cell of the receptacle usually slightly longer than the subbasal, and distally slightly broader. The stalk-cell of the appendage somewhat broader than long, with distal secondary thickening. Axis of the appendage consisting of five cells, the two lower more deeply colored; the basal broader than long, sterile; the subbasal sometimes larger and, like the third and fourth, bearing two antheridia, the fifth bearing but one, which is surmounted by two superposed; the appendage rather stout, tapering to a point distally, lying flat against the venter, which it crosses obliquely, extending beyond it, the antheridia turned to the right. Stalk-cell of the perithecium relatively large, the cells of this region indistinguishable from the fact that the mature individual, owing to its curvature, presents either an anterior or posterior view. Venter somewhat asymmetrical, more or less inflated distally, not very abruptly distinguished from the stout neck, which merges into the curved blunt tip and apex with slight differentiation; the lips hardly distinguished. Spores about $28 \times 3.5 \mu$. Perithecia $100-112 \times 28-35 \mu$. Appendage about $50 \times 12 \mu$. Receptacle $45-50 \times 16 \mu$. Total length $180-200 \mu$.

On the legs and wings of a species of *Diopsis*. No. 2303, Kamerun, W. Africa.

Distinguished from other known species on *Diopsis* by its appendage, the axis of which includes but five cells. The wall-cells of the venter and neck appear to have a slight continuous twist, the course of which cannot be clearly made out. The material, though not abundant, was obtained from three different individuals of the host.

***Stigmatomyces longirostratus* nov. sp.**

Pale dirty brownish yellow throughout, greatly elongated. Basal cell slightly curved and tapering below, distally broader than the base of the somewhat paler and slightly longer subbasal cell, the margins of which are somewhat convex. Stalk-cell of the appendage about four times as long as broad and of nearly equal diameter throughout, the distal end modified by a secondary thickening, which is deeply colored and about as large as the basal cell of the appendage. Appendage slightly divergent, elongate, tapering, slender; its axis consisting of twelve cells; the basal sterile, somewhat longer than broad, more deeply colored; the subbasal concolorous, half as long as broad, bearing two antheridia, as do all the other cells of the axis

except the twelfth, which bears only one and is followed by two others superposed; the antheridia directed outward, and superposed in a single row, with little if any right and left divergence. Stalk-cell of the perithecium concolorous with the subbasal cell, ending below the insertion of the appendage, somewhat prominent externally, obliquely separated from the secondary cell, which overlaps less than half its length; distally and externally prominent, and modified by a more deeply colored secondary thickening, as are the upper outer angles of the basal cells above. Basal cell region somewhat broader than the base of the venter, which is somewhat inflated below, and prolonged distally into a neck-like portion, with somewhat irregular margins, which is rather abruptly swollen below its junction with the neck proper: the latter paler, of nearly uniform diameter, slightly curved outward, its junction with the tip broader and geniculate; the tip bent outward, broad, slightly inflated, hardly distinguished from the apex; which is bent upward slightly, short and truncate, the lips hardly distinguished. Spores about $35 \times 4 \mu$. Perithecium $320 \times 40 \mu$. Appendage $140 \times 14 \mu$. Receptacle $115 \times 25 \mu$. Total length somewhat over 500μ .

On the wings of a species of *Diopsis*. No. 2715, Kamerun, W. Africa.

Allied to the other species on *Diopsis* and distinguished by its great length, twelve-celled appendage, and peculiarly shaped perithecium. Only one quite mature individual has been examined. The wall-cells of the venter appear to be slightly twisted, but this cannot be clearly made out in the type.

***Stigmatomyces porrectus* nov. sp.**

Rather elongate, with somewhat irregular outline. Basal cell of the receptacle obconical, slightly tinged with yellowish, a secondary thickening involving the whole cell, its upper margin extending just below and parallel to the horizontal septum which it may even touch; the subbasal cell perfectly hyaline, abruptly narrower, usually distinctly shorter and subsodiametric. Stalk-cell of the appendage relatively small, somewhat irregular, about twice as long as broad, its lower half or more hyaline, the rest more or less tinged with yellow, or brownish yellow, which is associated with secondary thickening; the basal cell of the appendage as broad, or even slightly broader, more deeply suffused, slightly broader than long, sterile; the subbasal

cell concolorous, very small, flattened-triangular, bearing two antheridia; the rest of the axis consisting of four, rarely three cells, all bearing two antheridia, except the last, which bears one, and is followed by two others which are superposed; the base of the appendage divergent at an angle of 45° , the rest bent or curved upward, the stout antheridial necks prominent and directed outward. Stalk-cell of the perithecium large, quite hyaline, extending considerably above the insertion of the appendage, the secondary cell subtriangular, extending half way to the base of the primary cell, hyaline below, brownish yellow above, and concolorous with the perithecium and basal cells; which are somewhat larger, irregular in form, extending upward somewhat above the base of the ascigerous cavity; the venter somewhat asymmetrically inflated near the base, often with a slight external angle, tapering distally, the wall-cells slightly spiral, describing about an eighth of a turn, the distal end hardly if at all distinguished from the base of the neck which simulates the usual venter termination, forming a slight enlargement above which the rest of the neck, which tapers slightly and is rather strongly curved outward, is rather clearly distinguished; the tip relatively large, usually slightly inflated and broader than the neck below, the apex short and blunt, the lips hardly distinguishable. Spores about $24 \times 2.5 \mu$. Perithecia $125-155 \times 35-42 \mu$. Appendage $52-60 \times 15 \mu$. Receptacle $85-140 \times 20-24 \mu$. Total length $250-350 \mu$.

On the wings and tip of abdomen of *Diopsis* sp. No. 2301, Kamerun, W. Africa.

Specimens of this peculiar form have been examined from several individual hosts, and in all cases are somewhat irregularly developed, the asci in many cases not maturing well. It is allied to the other species on *Diopsis*, but is readily distinguished from *S. Diopsis*, the only other form having a strongly divergent appendage in the characters of the latter as well as in other respects.

***Stigmatomyces Schwabianus* nov. sp.**

Color throughout nearly uniform dirty yellowish. Receptacle relatively small, somewhat curved, the basal cell tapering below, the subbasal cell somewhat shorter and broader. Stalk-cell of the appendage somewhat prominent distally, a secondary thickening involving its upper half or more; the appendage nearly erect, slightly incurved; the antheridia external and superposed in an almost uni-

form vertical series with little right and left divergence; the basal cell large, darker, sterile, hardly as long as broad, the subbasal small, subtriangular; the rest of the axis consisting of six cells all bearing, like the subbasal, two antheridia; except the uppermost which bears one, and is followed by two others which are terminal and superposed. Primary stalk-cell larger than the subequal cells above it, distally separated obliquely from the secondary cell, its extremity lying some distance below the insertion of the appendage. Venter slightly or distinctly inflated, the wall-cells describing one half to a whole turn, the curved neck being turned inward in the former case and outward in the latter; the base of the neck hardly distinguished from the venter, and separated by a more or less sharp constriction from its distal portion; which is usually narrower in the middle, swollen at either end, abruptly narrowed or constricted below the tip; which is short, inflated, tapering to the blunt, subtruncate apex; the lips closely apposed, rather broad, not prominent. Spores about $40 \times 5 \mu$. Perithecia $175-280 \times 30-42 \mu$. Appendage $65-80 \times 12-14 \mu$. Receptacle $60-90 \times 21-24 \mu$. Total length $250-400 \mu$.

On the legs and at the base of the wings of *Diopsis* sp. Kamerun, W. Africa. Nos. 2302, 2365, 2676, 2718 and 2719.

The peculiarities of this species especially of the perithecium are more conspicuous in older individuals, the constrictions and curvature of the neck as well as the spiral character of the wall-cells varying considerably. The species is related to *S. Diopsis* and *S. porrectens*, from which it is abundantly distinct.

On Drosophilidae.

Stigmatomyces subinflatus nov. sp.

Straight, or the axis of the receptacle bent at a slight angle, pale yellow; the receptacle nearly hyaline, the basal and stalk-cells of the appendage, and the inflation below the tip tinged with reddish. Basal cell of the receptacle longer, even twice as long as the subbasal, the septum slightly oblique, the subbasal cell but slightly broader distally. Stalk-cell of the appendage twice as long as broad, faintly reddish, the outer margin straight or slightly convex, rounded abruptly inward to the basal cell of the appendage; which is relatively large, somewhat longer than broad, distally slightly oblique, sterile, more distinctly reddish, especially the septa; the rest of the axis,

which is slightly and somewhat obliquely curved inward, consisting of three cells, the lowest much smaller, triangular-flattened, each bearing a single rather large antheridium, the series terminated by a fourth. Stalk- and basal cells all lying below the insertion of the appendage, relatively small and subequal. Venter rather long and narrow, and almost symmetrically inflated; the wall-cells separated by a wing-like spiral ridge which makes nearly a half turn; neck rather abruptly distinguished, the base hardly spreading, about half as long as the venter, nearly isodiametric, and swelling abruptly to form a clearly distinguished subsymmetrical enlargement at its junction with the tip; which, with the apex, forms a short blunt termination, the rounded lip-edges rather coarse, slightly prominent, and asymmetrical. Spores about $18 \times 2.5 \mu$. Perithecia $110-120 \times 28-30 \mu$; venter 68μ . Appendage $35 \times 9 \mu$. Receptacle $45-55 \times 16 \mu$. Total length $150-175 \mu$.

On the anterior legs of a pale species of *Drosophila*. Kamerun, W. Africa, No. 2180.

This species is distinguished from other forms on *Drosophilidae* by its four-celled appendage, which bears but four antheridia, and the subterminal enlargement of the perithecium. The spiral ridges of the venter are similar to those of *S. Sigalossae*, which is otherwise quite different.

***Stigmatomyces varians* nov. sp.**

Symmetrically somewhat sigmoid, the perithecium proper about twice as long as the rest of the individual. Receptacle hyaline, usually yellowish distally and above the foot; the basal cell tapering below, curved, often twice as long as, or less frequently slightly shorter than, the subbasal cell; which may be distinctly prominent above the basal, its distal end much broader, its margins usually slightly concave. Stalk-cell of the appendage slightly more than twice as long as broad, its distal third or more involved by a yellow secondary thickening, its outer margin very slightly prominent below the basal cell of the appendage, which is flattened, usually becoming reddish, broader than long, without antheridia, surmounted by a still shorter cell bearing two antheridia, which is followed by two axis-cells bearing two antheridia each, and a third which bears one; the axis ending in two terminal ones which are superposed, the upper larger and indistinctly spinose; the appendage erect or sometimes slightly

divergent, the antheridia turned outward and a little sidewise. Stalk-cell four sided, but subtriangular, the three longer sides subequal, the secondary stalk-cell equal, or larger, with a yellow somewhat prominent thickening at its upper outer angle which may resemble a separated cell; the outer basal cell about as large, usually distinctly prominent externally below the venter; which is variably, sometimes considerably and evenly, inflated; or narrower and more or less prominently concave below the variably prominent endings of the wall-cells, which have a very slight spiral twist; the neck curved outward, stout, typically with broadly spreading base, which may be narrower and followed above by a slight general shallow constriction, or may enlarge gradually to its junction with the tip; which is usually more or less distinctly constricted, bent outward; the apex rather stout, short, with somewhat irregularly compressed lips. Spores $35 \times 4 \mu$. Perithecium $120-140 \times 30-35 \mu$. Appendage $42-45 \times 8-10 \mu$. Receptacle $45-55 \times 20-26 \mu$. Total length $190-225 \mu$.

On the superior surface of the abdomen of a genus of flies belonging to the Drosophilidae. Kamerun, W. Africa, Nos. 2753 (Type), 2668 and 2667 the latter a somewhat smaller species.

This species, which belongs to the group of forms occurring on Drosophilidae and including *S. Sigallossae*, *S. Scaptomyzae*, *S. Drosophilae*, is a variable and rather puzzling form. The portions above the receptacle are rather clear, pale, almost lemon yellow. The two lower cells of the appendage appear to represent the normal basal cell, which has divided in two, the lower remaining sterile; while the smaller, upper, bears two antheridia. The habit may be evenly, but not deeply, sigmoid, as in the type; or the axis of the receptacle and venter may be coincident and straight. The perithecium varies greatly, the termination of the wall-cells of the venter abruptly prominent in the type, or the end of the venter narrower and rounded, and subtended by a more or less evident general constriction. The neck may be stout and slightly tapering from a broad base, or more slender, basally constricted, and distally somewhat enlarged, and other variations might be mentioned. The host is a reddish brown drosophilid, with conspicuous longitudinal white lines on the thorax which contrast with a dark edging. I have been unable to obtain a determination of the genus of which more than one species is probably represented in the host material.

*On Ephydridae.****Stigmatomyces excavatus* nov. sp.**

Straight, flexed, or slightly sigmoid; becoming pale yellowish above the hyaline, thick-walled receptacle; which is short and stout, tapering slightly from the distal end to the base, the subbasal cell usually slightly less than twice as long as the basal, which is rounded above the small foot, the septum slightly oblique. Stalk-cell of the appendage relatively broad, overlapping the subbasal cell, and forming a rounded prominence, distally and externally, extending above the small reddish brown basal cell of the appendage, which thus lies at the bottom of a socket. Appendage long, slender, attenuated; usually straight, with the antheridia external, or sometimes lateral. Axis of the appendage consisting of more often seven cells, those above the basal hyaline, flattened-triangular; the seventh bearing a single antheridium, the rest two, or the lower more than two; the rest of the appendage slightly curved, attenuated, and consisting of two to three superposed antheridia; antheridial necks short, stout and curved. Stalk-cell subtriangular, rather abruptly slightly broader than the receptacle externally, and separated by an oblique septum; the secondary stalk-cell slightly smaller, separated by a curved oblique septum, hardly larger than the basal cells above. The venter three to four times as long as broad, its base slightly narrower than the basal cell region, gradually broadening distally, usually abruptly broader below the neck; which is nearly as long, tapering from its broad base to the tip, which is hardly distinguished by a slight depression; the tip slightly inflated and tapering, twice as long as the apex, which is subtruncate and bent inward, but not otherwise distinguished. Spores about $25 \times 3 \mu$. Perithecia $140-200 \times 20-28 \mu$; stalk- and basal cell region $35 \times 22 \mu$. Receptacle $80 \times 25 \mu$. Appendage $70-95 \times 7 \mu$; its stalk-cell $35-45 \times 10-15 \mu$. Total length $280-335 \mu$ or less.

On superior surface of abdomen of an ephydrid allied to *Notiphila*. No. 2637a. Kamerun, West Africa.

This species is clearly distinguished by its short stout receptacle, long slender and tapering perithecium and appendage, and especially by the protrusion of the stalk-cell of the appendage, which forms a depression overtopping the basal cell of the appendage.

Stigmatomyces ventriosus nov. sp.

Relatively short and stout. Receptacle hyaline, the basal cell usually somewhat curved below, tapering to the foot; the subbasal cell much smaller, usually broader than long. Stalk-cell of the appendage tinged with amber-brown, relatively narrow, more than twice as long as broad, its bluntly pointed base overlapping the subbasal cell slightly, if at all; its outer margin straight or slightly concave, and somewhat prominent below the broad insertion. Axis of the appendage consisting of four successively smaller cells, the fourth much smaller and bearing one antheridium, followed by two which are superposed above it, the upper spinose; all the others bearing two antheridia, which are usually turned somewhat obliquely sidewise; the basal cell somewhat longer than broad, amber-brown, the rest of the appendage slightly suffused below; the antheridia appressed with hardly divergent necks. Stalk-cell and secondary stalk-cell of the perithecium nearly equal, broader than long, flattened-triangular, concolorous with the stalk-cell of the appendage and the basal cells, which are small and subtriangular; the secondary stalk-cell slightly convex externally, its margin often reaching to the subbasal cell of the receptacle: venter somewhat darker amber-brown, short and stout, its axis diverging at a slight angle to that of the appendage and receptacle; its outer margin straight or becoming convex, its inner bulging very strongly; the wall-cell on the left side forming a slightly elevated area ending in a more or less distinct and abrupt broad ridge below the short, usually abruptly curved, neck; the tip and apex as long as the subhyaline neck, and turned abruptly inward by its curvature; the tip tinged with brownish yellow: the apex short, not distinguished, hardly tapering; the lips prominent, rather coarse, two of them lower and paired, the other two forming a blunt point which projects beyond them; the pore usually directed inward, but sometimes sidewise, owing to a slight twist of the wall-cells. Spores $30 \times 3 \mu$. Perithecia $75-85 \mu$. The venter $42-48 \times 30-36 \mu$. Appendage $45-50 \times 10 \mu$. Receptacle $42 \times 18 \mu$. Total length to tip of perithecium $120-140 \mu$.

On the inferior abdomen of a small fly resembling *Discocerina*. No. 2743a, Kamerun, West Africa.

This small species appears to be more nearly related to *S. Discocerinae*, but is very readily recognized by its "pot-bellied" venter and short incurved neck. The thirty individuals examined show no important variation.

*On Ortalidae.***Stigmatomyces Ortalidanus** nov. sp.

Very long and slender, straight, or but slightly curved. Basal cell of the receptacle tapering to the small foot, usually slightly bent below, with secondary thickenings of the wall which usually become blackish brown, the suffusion sometimes extending so as to stain the yellowish primary wall; subbasal cell more than twice as long, slightly narrower than the basal, just above the horizontal septum; hyaline, or yellowish, usually straight, thick-walled and nearly isodiametric. Stalk-cell of the appendage extending only to the subbasal cell, relatively narrow, its outer margin nearly straight, except for a slight elevation below the insertion, which occupies almost the whole of its distal surface. Appendage long, slender and distally attenuated, consisting of about eight to ten axis-cells; the basal amber-brown, broader than long, its upper margin somewhat oblique below a small subtriangular hyaline cell which is separated from it distally and bears two superposed antheridia; the cells above the fifth usually somewhat longer and flatter than those below; all the axis-cells hyaline, and producing two antheridia each, arranged in a double series; the necks of the lower in each turned slightly sidewise, and of the upper, outward; the appendage ending in two superposed antheridia, below which the last cell of the axis is often also transformed into two superposed antheridia. Stalk-cell region of the perithecium much elongated; the primary stalk-cell greatly enlarged, thick-walled, hyaline, extending far above the insertion of the appendage, its distal fifth to third, or even more, overlapped by the bluntly pointed base of the much smaller, long-triangular secondary stalk-cell, the upper margin of which is horizontal, with an external brownish thickening; basal cells relatively elongate, the inner sometimes extending down nearly to the middle of the secondary stalk-cell; none of the basal cells overlapping the ascigerous cavity, but this region slightly broader than the base of the venter, owing to the presence of distal brownish thickenings in each cell. Venter becoming tinged with brownish yellow, more than three times as long as broad, straight, nearly symmetrical, very slightly inflated, its extremity tapering slightly to the base of the concolorous neck; which is not otherwise distinguished, straight, slightly and evenly tapering throughout, the wall-cells slightly twisted, as are those of the venter, and becoming more or less evidently corru-

gated by about eight successive elevations, usually more conspicuous in the distal half; the tip distinguished by an abrupt inflation, short, slightly tapering; the apex much shorter, rather broad and blunt, straight or slightly bent, usually turned so as to appear symmetrical, with a median elevation, or oblique when seen sidewise. Spores, about $45 \times 4 \mu$. Perithecia, stalk- and basal cell portion $100-210 \mu \times 30-35 \mu$; venter $90-105 \times 30-38 \mu$; neck $122 \times 20-28 \mu$ or less; tip and apex $25-30 \times 12 \mu$ distally. Appendage $100-125 \times 15 \mu$ at base; stalk-cell $50-60 \times 14-18 \mu$. Receptacle $250-280 \times 32 \mu$. Total length 740 or less $\times 35-40 \mu$.

On the upper surface of the abdomen of a large black fly belonging to an undetermined genus of the Ortalidae. Kamerun, W. Africa, No. 2721.

A large species well distinguished by its elongate slender form, suffused basal cell, slender tapering appendage, corrugated neck etc. The twist in the wall-cells of the venter and neck is often conspicuous, though sometimes hardly apparent, and increases with age, as does the corrugation of the neck.

On Oscinidae.

STIGMATOMYCES CONSTRICTUS Thaxter.

Specimens of this variable species, with and without the characteristic constriction of the receptacle, have been examined from Kamerun on *Anatrichus erinaceus*, No. 2644, and on other genera of the Oscinidae, Nos. 2650, 2652, 2726, 2727, 2728 and 2729.

On Trypetidae.

Stigmatomyces Dacinus nov. sp.

Habit rigid, erect, straight or somewhat curved throughout, the walls relatively thick. Basal cell of the receptacle slightly tinged with brownish yellow, tapering to the pointed foot; the subbasal cell twice as long, or less, hyaline, of nearly uniform diameter. Stalk-cell of the appendage narrow, somewhat curved inward, about as long as the subbasal cell, which it overlaps from one quarter to one half; distally twice as broad as the insertion which lies distinctly above

the primary stalk-cell of the perithecium; the antheridia mostly external; the axis of the appendage consisting of usually eight, sometimes of seven cells, the basal sterile, brownish yellow; the rest hyaline, the upper separated by slightly oblique septa, all bearing two superposed antheridia, those borne by the distal cell surmounted by an additional pair which terminate the appendage: antheridia straight, pointed, obliquely superposed. Stalk-cell of the perithecium hyaline, relatively large, more than twice as long as broad, slightly if at all broader at the base, the secondary stalk-cell yellowish brown, overlapping it about one half, hardly surpassing it distally, subtriangular, externally prominent; the basal cells relatively small, subtriangular, concolorous with the venter. Venter brownish yellow, straight, nearly symmetrical, broadly elliptical, the wall-cell making a quarter to a half turn, the spreading base of the short stout neck not abruptly distinguished; the tip subtended by a nearly symmetrical depression of the outline on both sides, abruptly and almost symmetrically inflated; the apex thus clearly distinguished, the lip-cells symmetrically paired, the inner pair turned outward, if the twist is one half, and surmounted by the outer, which form a blunt terminal free projection beyond them, half as long as the whole apex. Spores $42 \times 3.2 \mu$. Perithecia $140-160 \times 42 \mu$, the largest $180 \times 50 \mu$; the terminal projection $10-15 \mu$. Appendage $70-85 \mu$. Receptacle $86-105 \mu$. Length from foot to insertion $100-155 \mu$ by $42-50 \mu$ at insertion. Total length, average, 280μ ; longest 350μ .

On *Dacus* sp. No. 2128, Sarawak, Borneo.

This species does not seem nearly related to any described form and is quite unlike the others which are known to occur on Trypetidae. It is very clearly distinguished by the characters above enumerated, and the abundant material examined shows little variation except in size.

***Stigmatomyces hexandrus* nov. sp.**

Similar to *S. separatus* in general appearance, larger. Receptacle hyaline, straight or slightly bent, the basal cell sometimes not more than half as long as the subbasal, and usually somewhat prominent below it on the posterior side. The subbasal cell tapering slightly and evenly from apex to base, the former slightly prominent, especially on the anterior side. Stalk-cell of the appendage hardly overlapping the subbasal cell, rather narrow, more than twice as long as broad, its margin straight or slightly concave, but slightly prominent

distally below the basal cell of the appendage, which is nearly twice as long as broad; the axis of the appendage consisting of three cells, the two lower bearing each two, the third a single antheridium; a sixth terminal antheridium bent outward, its inner margin strongly convex, with a conspicuous subterminal spine; the series turned sidewise or outward. Stalk-cell of the perithecium slightly larger than the secondary cell and separated by an oblique septum; the outer basal cell smaller than the somewhat rounded inner one, and distinctly prominent externally below the venter, which broadens somewhat gradually from base to apex; its surface very finely and inconspicuously granular, its base somewhat higher than the insertion of the appendage, the margins often slightly convex; the spreading base of the neck sometimes rather abruptly distinguished; the neck for the most part somewhat longer than the venter, often slightly narrower in the middle, broader distally below the rather abruptly distinguished tip; tip and apex hardly distinguished, slightly bent and tapering, the lip-cells five-papillate, the two posterior lower, the middle of the three others highest. Spores $28-30 \times 3.5 \mu$. Perithecium $150-180 \times 32-38 \mu$. Appendage $55 \times 10 \mu$. Receptacle $120-190 \times 24-28 \mu$. Total length $280-300 \mu$ or less; maximum $370 \times 42 \mu$.

On the superior abdomen and legs of a fly belonging to the Trypetidae. No. 2296 and 2642, Kamerun, W. Africa.

Although less rigid and regular in outline, this species recalls *S. separatus* in general appearance and coloration. It is at once distinguished by its appendage, which is three-celled, and bears but six antheridia; the terminal one rather characteristically inflated on the inner side, and spinose. Abundant material has been examined.

***Stigmatomyces separatus* nov. sp.**

Habit rigid and straight, or the neck and tip bent at a slight angle to the venter. Receptacle hyaline, sub-isodiametric, or tapering very slightly from apex to base; the basal cell about two thirds as long as the subbasal; the septa horizontal, both cells hyaline and contrasting with the dirty reddish brown suffusion of the part above, which includes the venter of the perithecium. Stalk-cell of the appendage overlapping the subbasal cell very slightly, about twice as broad as long, its external margin straight or more often concave, distally rather abruptly prominent below the concolorous basal cell of the appendage; which is otherwise paler yellowish, its axis consisting of

five cells, the two lower producing usually three, the third and fourth two, and the fifth one antheridium; the appendage terminated by two which are superposed, the necks rather short and stout, and directed obliquely sidewise. Stalk-cell of the perithecium about as broad as long, overlapped on the left side by the secondary stalk-cell, which is slightly prominent externally; the basal cells subequal, hardly prominent; venter straight, its base nearly opposite the insertion of the appendage, slightly and symmetrically inflated below, the margins of the upper third often slightly concave, the surface faintly granular, distally somewhat prominent below the spreading base of the rather stout neck; which is almost exactly as long, slightly tapering, or more often nearly isodiametric, slightly but abruptly enlarged at its junction with the tip; the latter slightly bent inward, somewhat tapering, the apex hardly distinguished, the lips oblique, the outer being bluntly pointed and more prominent. Spores $30 \times 3.5 \mu$. Perithecia $155-176 \times 28-35 \mu$. Appendage $50-65 \times 7 \mu$. Receptacle $70-80 \times 18-20 \mu$. Total length $210-280 \mu$.

On the anterior surface of the head of a rather large dark fly with mottled brown wings belonging to the Trypetidae? No. 2735, Kamerun, W. Africa.

Although this large rigid form does not seem referable to any of the described species, it has no striking characters which would at once distinguish it. The appendage normally bears thirteen antheridia, but in some cases there appear to be only two on the two lower cells. The appendage is so turned that it is difficult to determine the antheridial characters without a very high magnification. A large number of individuals has been examined.

***Stigmatomyces Chilomenis* nov. sp.**

Nearly hyaline, faintly tinged with greenish yellow. Receptacle small, the basal cell much narrower and subgeniculate above the foot, obliquely separated from the much smaller subtriangular subbasal cell; which is somewhat larger than the irregularly rounded stalk-cell of the nearly erect appendage, the basal cell of which is longer than broad, somewhat narrower below than the four subequal axis-cells above it; which are somewhat broader than long, and each bear an antheridium, the terminal cell bearing two, in the type, in addition to the terminal antheridium: antheridia with long stiff nearly straight necks directed obliquely upward and outward. Stalk-cell of the

perithecium small and narrow, constricted in the middle, with a slight twist; the secondary stalk-cell half as large, obliquely separated; the basal cells surrounding the base of the ascigerous cavity, and forming about one fifth of the stout body of the perithecium, which comprises the venter-, neck- and tip-regions, the neck-region somewhat broader and separated from the tip-region by a slight indentation; the relatively broad apex abruptly somewhat narrower, the lip-cells developing four erect appendages; two lateral and opposite, more slender, longer, tapering slightly to a blunt point, each subtended by a small rounded outgrowth hardly longer than wide; one posterior, straight, tooth-like, tapering evenly from a broad base to a small rounded apex, and somewhat shorter: one anterior opposite the last and somewhat shorter, similar, rather abruptly broader distally, the extremity broadly rounded. Spores $28 \times 3 \mu$. Perithecium to tips of appendages, including basal cell region, 135μ ; the appendages, longer, 30μ . Appendage $60 \times 7 \mu$ at base. Receptacle $60 \times 18 \mu$, including sharply pointed foot. Total length about 200μ .

On the elytra of *Chilomenes lunata* Fabr. No. 2158, Nairobi, British East Africa, Mearns.

This species is intermediate between *S. virescens* and *S. coccinelloides*; resembling the former in the character of its appendage, and to some extent, in the form of the perithecial outgrowths, more closely than the latter. Its very narrow, short stalk-cell and the form of the body of the perithecium recalls *S. coccinelloides*. The erect, symmetrically placed perithecial appendages are different from any of the varieties of the two related forms.



